

Essential Concepts in Business

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Gold standard

A **gold standard** is a monetary system in which the standard economic unit of account is based on a fixed quantity of gold. Three types can be distinguished: specie, bullion, and exchange.

- In the *gold specie standard* the monetary unit is associated with the value of circulating gold coins, or the monetary unit has the value of a certain circulating gold coin, but other coins may be made of less valuable metal.
- The *gold bullion standard* is a system in which gold coins do not circulate, but the authorities agree to sell gold bullion on demand at a fixed price in exchange for the circulating currency.
- The *gold exchange standard* usually does not involve the circulation of gold coins. The main feature of the gold exchange standard is that the government guarantees a fixed exchange rate to the currency of another country that uses a gold standard (specie or bullion), regardless of what type of notes or coins are used as a means of exchange. This creates a *de facto* gold standard, where the value of the means of exchange has a fixed external value in terms of gold that is independent of the inherent value of the means of exchange itself.

Most nations abandoned the gold standard as the basis of their monetary systems at some point in the 20th century, although many hold substantial gold reserves. A survey of leading American economists showed that they unanimously reject that a return to the gold standard would benefit the average American.

The gold specie standard arose from the widespread acceptance of gold as currency. Various commodities have been used as money; typically, the one that loses the least value over time becomes the accepted form. Chemically, gold is of all major metals the one most resistant to corrosion.

The use of gold as money began thousands of years ago in Asia Minor.

During the early and high Middle Ages, the Byzantine gold solidus, commonly known as the bezant, was used widely throughout Europe and the Mediterranean. However, as the Byzantine Empire's economic influence declined, so too did the use of the bezant. In its place, European territories chose silver as their currency over gold, leading to the development of silver standards.

Silver pennies based on the Roman denarius became the staple coin of Mercia in Great Britain around the time of King Offa, circa CE 757–796. Similar coins, including Italian denari, French deniers, and Spanish dineros circulated in

Europe. Spanish explorers discovered silver deposits in Mexico in 1522 and at Potosí in Bolivia in 1545. International trade came to depend on coins such as the Spanish dollar, the Maria Theresa thaler, and later, the United States trade dollar.

In modern times, the British West Indies was one of the first regions to adopt a gold specie standard. Following Queen Anne's proclamation of 1704, the British West Indies gold standard was a *de facto* gold standard based on the Spanish gold doubloon. In 1717, Sir Isaac Newton, the master of the Royal Mint, established a new mint ratio between silver and gold that had the effect of driving silver out of circulation and putting Britain on a gold standard.

A formal gold specie standard was first established in 1821, when Britain adopted it following the introduction of the gold sovereign by the new Royal Mint at Tower Hill in 1816. The United Province of Canada in 1853, Newfoundland in 1865, and the United States and Germany (*de jure*) in 1873 adopted gold. The United States used the eagle as its unit, Germany introduced the new gold mark, while Canada adopted a dual system based on both the American gold eagle and the British gold sovereign.

Australia and New Zealand adopted the British gold standard, as did the British West Indies, while Newfoundland was the only British Empire territory to introduce its own gold coin. Royal Mint branches were established in Sydney, Melbourne and Perth for the purpose of minting gold sovereigns from Australia's rich gold deposits.

The gold specie standard came to an end in the United Kingdom and the rest of the British Empire with the outbreak of World War I.

From 1750 to 1870, wars within Europe as well as an ongoing trade deficit with China (which sold to Europe but had little use for European goods) drained silver from the economies of Western Europe and the United States. Coins were struck in smaller and smaller numbers, and there was a proliferation of bank and stock notes used as money.

In 1792, Congress passed the Mint and Coinage Act. It authorized the federal government's use of the Bank of the United States to hold its reserves, as well as establish a fixed ratio of gold to the U.S. dollar. Gold and silver coins were legal tender, as was the Spanish real. In 1792 the market price of gold was about 15 times that of silver. Silver coins left circulation, exported to pay for the debts taken on to finance the American Revolutionary War. In 1806 President Jefferson suspended the minting of silver coins. This resulted in a derivative silver standard, since the Bank of

the United States was not required to fully back its currency with reserves. This began a long series of attempts by the United States to create a bi-metallic standard.

The intention was to use gold for large denominations, and silver for smaller denominations. A problem with bimetallic standards was that the metals' absolute and relative market prices changed. The mint ratio (the rate at which the mint was obligated to pay/receive for gold relative to silver) remained fixed at 15 ounces of silver to 1 ounce of gold, whereas the market rate fluctuated from 15.5 to 1 to 16 to 1. With the Coinage Act of 1834, Congress passed an act that changed the mint ratio to approximately 16 to 1. Gold discoveries in California in 1848 and later in Australia lowered the gold price relative to silver; this drove silver money from circulation because it was worth more in the market than as money. Passage of the Independent Treasury Act of 1848 placed the U.S. on a strict hard-money standard. Doing business with the American government required gold or silver coins.

Government accounts were legally separated from the banking system. However, the mint ratio (the fixed exchange rate between gold and silver at the mint) continued to overvalue gold. In 1853, the US reduced the silver weight of coins to keep them in circulation and in 1857 removed legal tender status from foreign coinage. In 1857 the final crisis of the free banking era began as American banks suspended payment in silver, with ripples through the developing international financial system. Due to the inflationary finance measures undertaken to help pay for the US Civil War, the government found it difficult to pay its obligations in gold or silver and suspended payments of obligations not legally specified in specie (gold bonds); this led banks to suspend the conversion of bank liabilities (bank notes and deposits) into specie. In 1862 paper money was made legal tender. It was a fiat money (not convertible on demand at a fixed rate into specie). These notes came to be called "greenbacks".

US: Post-Civil War

After the Civil War, Congress wanted to reestablish the metallic standard at pre-war rates. The market price of gold in greenbacks was above the pre-War fixed price (\$20.67 per ounce of gold) requiring deflation to achieve the pre-War price. This was accomplished by growing the stock of money less rapidly than real output. By 1879 the market price matched the mint price of gold. The coinage act of 1873(also known as the Crime of '73) demonetized silver. This act removed the 412.5 grain silver dollar from circulation. Subsequently silver was only used in coins worth less than \$1 (fractional currency). With the resumption of convertibility on June 30, 1879 the government again paid its debts in gold, accepted greenbacks for customs and redeemed greenbacks on demand in gold. Greenbacks were therefore perfect substitutes for gold coins. During the latter part of the nineteenth century the use of

silver and a return to the bimetallic standard were recurrent political issues, raised especially by William Jennings Bryan, the People's Party and the Free Silver movement. In 1900 the gold dollar was declared the standard unit of account and a gold reserve for government issued paper notes was established. Greenbacks, silver certificates, and silver dollars continued to be legal tender, all redeemable in gold.

Fluctuations in the US gold stock, 1862–1877

US gold stock

1862 59 tons

1866 81 tons

1875 50 tons

1878 78 tons

The US had a gold stock of 1.9 million ounces (59 t) in 1862. Stocks rose to 2.6 million ounces (81 t) in 1866, declined in 1875 to 1.6 million ounces (50 t) and rose to 2.5 million ounces (78 t) in 1878. Net exports did not mirror that pattern. In the decade before the Civil War net exports were roughly constant; postwar they varied erratically around pre-war levels, but fell significantly in 1877 and became negative in 1878 and 1879. The net import of gold meant that the foreign demand for American currency to purchase goods, services, and investments exceeded the corresponding American demands for foreign currencies. In the final years of the greenback period (1862–1879), gold production increased while gold exports decreased. The decrease in gold exports was considered by some to be a result of changing monetary conditions. The demands for gold during this period were as a speculative vehicle, and for its primary use in the foreign exchange markets financing international trade. The major effect of the increase in gold demand by the public and Treasury was to reduce exports of gold and increase the Greenback price of gold relative to purchasing power.

Advantages

- Long-term price stability has been described as one of the virtues of the gold standard. The gold standard makes it difficult for governments to inflate prices through expanding the money supply. Under the gold standard, significant inflation is rare, and hyperinflation is essentially impossible because the

money supply can only grow at the rate that the gold supply increases. High inflation under a gold standard is seen only when warfare destroys a large part of an economy, reducing the production of goods, or when a major new gold source becomes available. In the U.S., inflation occurred during the Civil War, which destroyed the economy of the South. Inflation also followed the California Gold Rush that made large amounts of gold available for minting. Historical data shows that the magnitude of short run swings in prices were far higher under the gold standard.

- The gold standard provides fixed international exchange rates between participating countries and thus reduces uncertainty in international trade. Historically, imbalances between price levels were offset by a balance-of-payment adjustment mechanism called the "price-specie flow mechanism". Gold used to pay for imports reduces the money supply of importing nations, causing deflation, which makes them more competitive, while the importation of gold by net exporters serves to increase their money supply, causing inflation, making them less competitive.
- A gold standard does not allow some types of financial repression. Financial repression acts as a mechanism to transfer wealth from creditors to debtors, particularly the governments that practice it. Financial repression is most successful in reducing debt when accompanied by inflation and can be considered a form of taxation. In 1966 Alan Greenspan wrote "Deficit spending is simply a scheme for the confiscation of wealth. Gold stands in the way of this insidious process. It stands as a protector of property rights. If one grasps this, one has no difficulty in understanding the statist's antagonism toward the gold standard."

Disadvantages

- The gold supply and hence monetary policy could no longer be used to stabilize the economy. The gold standard is often blamed for prolonging the Great Depression, as under the gold standard, central banks could not expand credit at a fast enough rate to offset deflationary forces.
- Although the gold standard brings long-run price stability, it is historically associated with high short-run price volatility. It has been argued by Schwartz, among others, that instability in short-term price levels can lead to financial instability as lenders and borrowers become uncertain about the value of debt.
- Deflation punishes debtors. Real debt burdens therefore rise, causing borrowers to cut spending to service their debts or to default. Lenders become wealthier, but may choose to save some of the additional wealth, reducing GDP.

- The money supply would essentially be determined by the rate of gold production. When gold stocks increase more rapidly than the economy, there is inflation and the reverse is also true. The consensus view is that the gold standard contributed to the severity and length of the Great Depression.
- Hamilton contended that the gold standard is susceptible to speculative attacks when a government's financial position appears weak. Conversely, this threat discourages governments from engaging in risky policy. For example, the U.S. was forced to contract the money supply and raise interest rates in September 1931 to defend the dollar after speculators forced the UK off the gold standard.
- Devaluing a currency under a gold standard would generally produce sharper changes than the smooth declines seen in fiat currencies, depending on the method of devaluation.
- Most economists favor a low, positive rate of inflation of around 2%. This reflects fear of deflationary shocks and the belief that active monetary policy can dampen fluctuations in output and unemployment. Inflation gives them room to tighten policy without inducing deflation.
- A gold standard provides practical constraints against the measures that central banks might otherwise use to respond to economic crises. Creation of new money reduces interest rates and thereby increases demand for new lower cost debt, raising the demand for money.

Gold standard and Bitcoin

According to research produced by the Bank of Canada, the emerging Bitcoin economy has many similarities with the economy based on gold standard, in particular:

- limited and predictable supply of the anchor of the monetary system
- no central bank or monetary authority controls the supply
- low or non-existent inflation
- virtually no arbitrage costs for international transactions
- Governments have less control over their domestic economies
- Governments lose seigniorage revenues that they obtain from the ability to almost costlessly create money

Edward Hadas and Michael Hiltzik noted that monetary systems based on Bitcoin and gold have some similar disadvantages:

- independence from government

- price declines
- less spending during crisis times

Silver standard

The **silver standard** is a monetary system in which the standard economic unit of account is a fixed weight of silver. The silver specie standard was widespread from the fall of the Byzantine Empire until the 19th century. Following the discovery in the 16th century of large deposits of silver at the Cerro Rico in Potosí, Bolivia, an international silver standard came into existence in conjunction with the Spanish pieces of eight. These silver dollar coins played the role of an international trading currency for nearly four hundred years.

In 1704, following Queen Anne's proclamation, the British West Indies became one of the first regions to adopt a gold standard in conjunction with the Spanish gold doubloon coin. In 1717, the master of the Royal Mint, Sir Isaac Newton, introduced a new mint ratio as between silver and gold, and this had the effect of putting Britain onto a *de facto* gold standard. Following the Napoleonic Wars, the United Kingdom introduced the gold sovereign coin and formally adopted a gold standard in 1821. At the same time, revolutions in Latin America interrupted the supply of silver dollars (pieces of eight) that were being produced at the mints in Potosi, Mexico, and Lima, Peru. The British gold standard initially extended to some of the British colonies, including the Australasian and Southern African colonies, but not to its North American colonies, British India, or to Southeast Asia. The Province of Canada adopted a gold standard in 1853, as did Newfoundland in 1865. In 1873, Imperial Germany changed over to the gold standard in conjunction with the new gold mark coin. The United States changed over to gold *de facto* in the same year, and over the next 35 years, all other nations changed to gold, leaving only China and the British colonies of Hong Kong and Weihaiwei on the silver standard. The silver standard finally came to an end when it was abandoned by China and Hong Kong in 1935.

Since the time that silver was discovered by the Spanish in the New World in the 16th, until the latter half of the 19th century, the value of gold in relation to silver maintained a relatively stable ratio of 15½:1. The reason for the subsequent sharp decline in the relative value of silver to gold has been attributed to Germany's decision to cease minting the silver thaler coins in 1871. On 23 November 1871, following the defeat of France in the Franco-Prussian War, Bismarck exacted one billion dollars in gold indemnity, and then proceeded to move Germany towards a new gold standard which came about on 9 July 1873 with the introduction of the gold mark.

It has also however been suggested by Nevada Senator John Percival Jones in 1876 in a speech to the US Senate, that the downward pressure on the market value of silver began somewhat earlier with the formation of the Latin Monetary Union in 1866.

Jones argues that the Latin Monetary Union involved a partial demonetization of silver.

Silver made a partial comeback in the first decade of the 20th century, such that the silver dollar coins of the Straits Settlements and silver peso coins of the Philippines had to be made smaller in size, and with a reduced silver content in order to prevent their silver value exceeding their recently established gold exchange value. An even larger rise in the price of silver after the First World War caused the Royal Mint in London to reduce the silver content of the sterling coinage. But silver never returned to the 15½:1 ratio of the first half of the 19th century, and the predominant long term trend was that silver continued to decline in value against gold.

Beginning in 1515, silver coins were minted at the silver mines at Joachimsthal - Jáchymov in Bohemia, now part of the Czech Republic. Although formally called *Guldengroschen*, they became known as *Joachimsthalers*, then shortened to *thaler*. The coins were widely circulated, and became the model for silver *thalers* issued by other European countries. The word *thaler* became *dollar* in the English language.

China had long used silver ingots as a medium of exchange, along with the cast copper-alloy cash. The use of silver ingots can be traced back as far as the Han dynasty (206 BC–220 AD). But prior to the Song Dynasty (960–1279), those silver ingots were used mainly for hoarding wealth. During the Song dynasty, for the first time in history the government became the sole issuer of paper currency after 1024, but cast coins and silver ingots were still used as a medium of exchange. In the Shanyuan Treaty, signed with the state of Liao in 1004, Song China agreed to pay an annual indemnity or tribute of 100,000 taels of silver and 200,000 bolts of silk. This was the first time bulk silver in tael was used as indemnity in a treaty with a foreign power. Silver ingots had a shape similar to a boat or a Chinese shoe during the Yuan dynasty (1279–1368). This became an ordinary shape for silver ingots during the following centuries.

The use of silver as money was very established at the time of the Ming dynasty (1368–1644). Paper money was first issued in 1375 by the founder Hongwu Emperor amid the ban of silver as medium of exchange. But due to the increasing depreciation, the paper money became basically worthless and the ban on silver usage was finally lifted in 1436 (1st year of the Zhengtong Emperor). Meanwhile, silver was made much available through foreign trade with the Portuguese and the Spanish, beginning in the 16th century. The great tax reform by the statesman Zhang Juzheng in 1581 (9th year of the Wanli Emperor) simplified the taxation and required

all the tax and corvee to be paid in silver. This can be seen as an indication of the firm position of silver in the monetary system of the Ming. However the reform would not have been a success or even feasible if the enormous amounts of silver had not been available through trade and imports from the Americas, mainly through the Spanish.

During the Qing dynasty (1644–1911), silver ingots were still used, but various foreign silver dollars had become popular in the Southern coastal region through foreign trade since the mid-Qing era. It was apparent that the silver ingots became awkward and more complicated to use *vis à vis* the foreign silver dollars, which could be counted easily, given their fixed specification and fineness of silver. However, the Qing dynasty very much resisted the idea of minting a silver coin of their own. It was not until late Qing, in 1890, that the first circulating silver coin was introduced by Guangdong province. The coin was at par with the Mexican peso, and soon this issue was emulated by other provinces. For these silver coins, the tael was still seen as the proper monetary unit, as the denomination of the coins were given as 0.72 tael (specifically: 7 mace and 2 candareens). Note for the treaties signed between the Qing dynasty and the foreign powers the indemnities were all in tael of silver, except for the Treaty of Nanking, where the silver dollar was indicated. It was not until 1910 that the "yuan" was officially announced as the standard monetary unit. The yuan was subdivided into 10 jiao or 100 fen, and specified as 0.72 tael of 900 fineness silver. The next year, 1911, the so-called "Great Qing Silver Coin" one yuan (dollar) was issued, but soon after the dynasty was replaced by the Republic.

The silver standard was again adopted and codified in 1914 by the newly established republic, with one yuan still being equal to 0.72 tael of 900 fineness silver. After the Chinese Nationalist Party(Kuomintang) unified the country in 1928, the yuan was again announced as the standard unit in 1933, but this time the relationship of the yuan to the tael was abolished, as one yuan was now equal to 26.6971 grams of 880 fineness silver. In the same year, 1933, while most of the Western countries (especially Britain and USA) had left the gold standard because of the Great Depression, it was said that China almost avoided the depression entirely, mainly due to having stuck to the silver standard. However, the US silver purchase act of 1934 created an intolerable demand on China's silver coins, and so in the end the silver standard was officially abandoned in September 1935 in favor of the four Chinese national banks' "legal note" issues. China would be the last to abandon the silver standard, along with the British crown colony of Hong Kong.

China's use of silver as a medium of exchange is reflected in the name for bank "銀行" (literally "silver house" or "silver office") and for the precious metal and jewel dealer "銀樓" (literally "silver building" or "silver shop").

The Indian rupee is derived from the *Rūpaya* a silver coin introduced by Sher Shah Suri during his reign from 1540 to 1545. Since this is around about the same time that the Spanish discovered silver at the Cerro Rico in Potosí, the silver value of the rupee maintained a stable relationship with gold right up until the early 1870s. From 1871, the value of silver depreciated relative to gold, due to the drop in demand for silver in the mints of Europe and North America, as those countries changed over to the gold standard. This had severe consequences for the rupee and it resulted in the fall of the Rupee. Following the Fowler report, India adopted the gold exchange standard in the year 1898, fixing the value of the rupee at exactly one shilling and four pence (1s 4d) sterling.

Great Britain's early use of the silver standard is still reflected in the name of its currency, the pound sterling, which traces its origins to the early Middle Ages when King Offa of Mercia introduced the silver penny, which copied the *denarius* of Charlemagne's Frankish Empire.

The early silver pennies were struck from fine silver (as pure as was available). However, in 1158, King Henry II introduced *Tealby penny*. English currency was almost exclusively silver until 1344, when the gold noble was put into circulation. However, silver remained the legal basis for sterling until 1816.

In 1663, a new gold coinage was introduced based on the 22 carat fine guinea. Fixed in weight at 44 $\frac{1}{2}$ to the troy pound from 1670, this coin's value varied considerably until 1717, when it was fixed at 21 shillings (21/-, 1.05 pounds). However, this valuation overvalued gold relative to silver compared to other European countries. British merchants sent silver abroad in payments while exports were paid for with gold. As a consequence, silver flowed out of the country and gold flowed in, leading to a situation where Great Britain was effectively on a gold standard. In 1816, the gold standard was adopted officially, with the silver standard reduced to 66 shillings (66/-, 3.3 pounds), rendering silver coins a "token" issue (i.e., not containing their value in precious metal).

The economic power of Great Britain was such that its adoption of a gold standard put pressure on other countries to follow suit.

The United States adopted a silver standard based on the Spanish milled dollar in 1785. This was codified in the 1792 Mint and Coinage Act, and by the federal government's use of the Bank of the United States to hold its reserves, as well as

establishing a fixed ratio of gold to the US dollar. This was, in effect, a derivative silver standard, since the bank was not required to keep silver to back all of its currency. This began a long series of attempts for America to create a bimetallic standard for the US dollar, which would continue until the 1920s. Gold and silver coins were legal tender, including the Spanish real. Because of the huge debt taken on by the US federal government to finance the Revolutionary War, silver coins struck by the government left circulation, and in 1806 President Jefferson suspended the minting of silver coins.

The US Treasury was put on a strict hard money standard, doing business only in gold or silver coin as part of the Independent Treasury Act of 1848, which legally separated the accounts of the federal government from the banking system. However the fixed rate of gold to silver overvalued silver in relation to the demand for gold to trade or borrow from England. Following Gresham's law, silver poured into the US, which traded with other silver nations, and gold moved out. In 1853 the US reduced the silver weight of coins, to keep them in circulation, and in 1857 removed legal tender status from foreign coinage.

In 1857, the final crisis of the free banking era of international finance began, as American banks suspended payment in silver, rippling through the very young international financial system of central banks. In 1861 the US government suspended payment in gold and silver, effectively ending the attempts to form a silver standard basis for the dollar. Through the 1860–1871 period, various attempts to resurrect bi-metallic standards were made, including one based on the gold and silver franc; however, with the rapid influx of silver from new deposits, the expectation of scarcity of silver ended.

The combination that produced economic stability was restriction of supply of new notes, a government monopoly on the issuance of notes directly and indirectly, a central bank, and a single unit of value. As notes devalued, or silver ceased to circulate as a store of value, or there was a depression, governments demanding specie as payment drained the circulating medium out of the economy. At the same time there was a dramatically expanded need for credit, and large banks were being chartered in various states, including those in Japan by 1872. The need for stability in monetary affairs would produce a rapid acceptance of the gold standard in the period that followed.

The Coinage Act of 1873, enacted by the United States Congress in 1873, embraced the gold standard and de-monetized silver. Western mining interests and others who wanted silver in circulation labeled this measure the "Crime of '73". For about five years, gold was the only metallic standard in the United States until passage of the Bland–Allison Act on February 28, 1878, requiring the US Treasury to purchase

domestic silver bullion to be minted into legal tender coins co-existent with gold coins. Silver Certificate Series 1878 was issued to join the gold certificates already in circulation.

By acts of Congress in 1933, including the Gold Reserve Act and the Silver Purchase Act of 1934, the domestic economy was taken off the gold standard and placed on the silver standard for the first time. The Treasury Department was re-empowered to issue paper currency redeemable in silver dollars and bullion, thereby divorcing the *domestic* economy from bimetallism and leaving it on the silver standard, although *international* settlements were still in gold.

This meant that for every ounce of silver in the U.S. Treasury's vaults, the U.S. government could continue to issue money against it. These silver certificates were shredded upon redemption since the redeemed silver was no longer in the Treasury. With the world market price of silver having been in excess of \$1.29 per troy ounce since 1960, silver began to flow out of the Treasury at an increasing rate. To slow the drain, President Kennedy ordered a halt to issuing \$5 and \$10 silver certificates in 1962. That left the \$1 silver certificate as the only denomination being issued.

On June 4, 1963, Kennedy signed Public Law 88-36, which marked the beginning of the end for even the \$1 silver certificate. The law authorized the Federal Reserve to issue \$1 and \$2 bills, and revoked the Silver Purchase Act of 1934, which authorized the Secretary of the Treasury to issue silver certificates (by now limited to the \$1 denomination). Because it would be several months before the new \$1 Federal Reserve Notes could enter circulation in quantity, there was a need to issue silver certificates in the interim. Because the Agricultural Adjustment Act of 1933 granted the right to issue silver certificates to the president, Kennedy issued Executive Order 11110 to delegate that authority to the Treasury Secretary during the transition.

Silver certificates continued to be issued until late 1963, when the \$1 Federal Reserve Note was released into circulation. For several years, existing silver certificates could be redeemed for silver, but this practice was halted on June 24, 1968.

Finally, President Richard Nixon announced that the United States would no longer redeem currency for gold or any other precious metal, forming the final step in abandoning the gold and silver standards. This announcement was part of the economic measures now known as the "Nixon Shock".

Due to the monetary policy of the U.S. Federal Reserve, calls for a return to the gold standard have returned. Some states have chosen to use a loophole in the Federal Reserve act that gives individual states the right to issue currencies of gold or silver coins or rounds. This was done because the Federal Reserve Act does not allow them

to print their own currency if they wished. As of January 2012, Utah allowed the payment of debt to be settled in silver and gold, and the value of the American silver or gold rounds used was pegged to the price of the given precious metal. Payment in some cases can be requested to be made in silver or gold rounds. As of 2011, eleven other U.S. states were exploring their options to possibly make similar changes like Utah.

Labour voucher

Labour vouchers (also known as **labour cheques**, **labour certificates**, and **personal credit**) are a device proposed to govern demand for goods in some models of socialism, unlike money does under capitalism.

Unlike money, vouchers cannot circulate and are not transferable between people. They are also not exchangeable for any means of production hence they are not transmutable into Capital. Once a purchase is made the labour vouchers are either destroyed or must be re-earned through labour. Therefore, with such a system in place, monetary theft would become impossible.

Such a system is proposed by many as a replacement for traditional money while retaining a system of remuneration for work done. It is also a way of ensuring that there is no way to 'make money out of money' as in a capitalist market economy.

Additionally, the only kind of market that could exist in an economy operating through the use of labour vouchers would be an artificial market (arket) for mostly non-productive goods and services; as with the dissolution of money, capital markets could no longer exist and labour markets would also likely cease to exist with the abolition of wage labor which would by necessity occur with the adoption of vouchers.

Author and activist Michael Albert and economist Robin Hahnel have proposed a similar system of remuneration in their economic system of participatory economics (parecon). A difference is that in parecon "credits" are generally awarded based on both the time spent working and the amount of effort and sacrifice spent during labour, rather than simple contribution. Some later advocates of participism and parecon have also proposed awarding more based on job difficulty or danger. Also, in contrast to the physical note or cheque format used for labour vouchers in the past, parecon credits are proposed as being entirely digital in keeping with advances with technology and are stored in electronic accounts and usable through cards similar to current day debit cards.

Labour vouchers were first proposed in the 1820s by Josiah Warren and Robert Owen. Two early attempts at implementing labour vouchers (called labour notes at the time by their proponents) were made by both following their experiences attempting to establish a utopian community at New Harmony, Indiana, in which currency was prohibited.

In 1827, Josiah Warren established the Cincinnati Time Store where goods could be purchased with labor vouchers representing an agreement to perform labor. He folded the store in 1830 in order to devote his effort to establishing communities that implemented his principles of labour-based prices.

Beginning in 1832, Robert Owen and his followers attempted to implement labour notes in London and Glasgow by establishing marketplaces and banks that accepted them.

The followers of Robert Owen stood for a society of co-operative communities. Each community would own its own means of production and each member of a community would work to produce what had been agreed was needed and in return would be issued with a labour voucher certifying for how many hours he or she had worked; a person could then use this labour voucher to obtain from the community's stock of consumer goods any product or products which had taken the same number of hours to produce.

Owen believed that this co-operative commonwealth could begin to be introduced under capitalism and in the first half of the 1830s some of his followers established "labour bazaars" on a similar principle: workers brought the products of their labour to the bazaar and received in exchange a labour voucher which entitled them to take from the bazaar any item or items which had taken the same time to produce, after taking into account the costs of the raw materials. These bazaars were ultimately failures but the idea of labour vouchers appeared in substantially similar forms in France in the writings of Pierre-Joseph Proudhon.

Although he disagreed with the manner in which they were implemented by Owen, they were later advocated by Karl Marx in 1875 as a way of dealing with any immediate and temporary shortages upon the establishment of socialism. Marx explained that this would be necessary since socialism emerges from capitalism and would be "stamped with its birthmarks". In Marx's proposal, early socialist society would reward its citizens according to the amount of labour they contribute to society.

[...] the individual producer receives back from society—after the deductions have been made—exactly what he gives to it. What he has given to it is his individual quantum of labor. For example, the social working day consists of the sum of the individual hours of work; the individual labor time of the individual producer is the part of the social working day contributed by him, his share in it. He receives a certificate from society that he has furnished such-and-such an amount of labor (after deducting his labor for the common funds); and with this certificate, he draws from the social stock of means of consumption as much as the same amount of labor cost.

The same amount of labor which he has given to society in one form, he receives back in another."

— *Karl Marx, Critique of the Gotha Programme (1875)*

Marx was adamant in saying that labour vouchers were not a form of money as they cannot circulate—a problem he pointed out with Owen's system of labour-time notes.

During the Great Depression, European communities implemented local currencies with varying success. The aptly-named economist Sir Leo Chiozza Money advocated for a similar monetary scheme in his 1934 book *Product Money* (Methuen) with notes or certificates being issued for productive work and destroyed once exchanged for consumption goods. More modern implementations as time-based currencies were implemented in the United States starting in the 1970s.

The following political and economic systems propose the adoption of labour vouchers (in some form or another) either permanently or as a temporary means of remuneration during a transitional stage between a monetary economy and a completely moneyless economy based on free association.

- Owenism
- Mutualism
- Collectivist anarchism
- DeLeonism
- Participism
- Inclusive Democracy

Inclusive Democracy is unique in proposing two kinds of vouchers. Basic vouchers (BVs) issued to each citizen according to need; are used for essential goods and services such as health care. And non-basic vouchers (NBVs) awarded to each worker for labor contributed are used to pay for non-essential commercial goods and services.

Capitalists—whether statist, minarchist, or anarcho-capitalist—generally oppose labour vouchers as they are not money and thus claim an economy using them could not set prices according to marginal utility and would theoretically have to rely on the labour theory of value, which adherents of the subjective theory of value generally see as inflexible and restricting economic freedom of choice for the consumer. Some proposed systems which advocate labour vouchers, namely participism, reject the labour theory of value.

The system has also been criticized by many libertarian socialists, particularly anarcho-communists, who propose abolishing all remuneration and prices

and advocate instead a gift economy with value determined by calculation in kind. Peter Kropotkin, in criticizing anarcho-collectivism's retaining of labour vouchers and cheques, said:

"for after having proclaimed the abolition of private property, and the possession in common of all means of production, how can they uphold the wages system in any form? It is, nevertheless, what collectivists are doing when they recommend labour-cheques."

The World Socialist Movement has argued against using labour vouchers as either a permanent or a temporary system while transitioning to their desired anarcho-communist economy based on free access. They claim that seeing as most of the occupations that currently exist under capitalism will no longer exist, scarcity would no longer be an issue. They also state that:

Labour vouchers would tend to maintain the idea that our human worth is determined by how much or how many goods we can own (or produce). Labour vouchers imply that someone must police who takes the goods produced by society. In other words there must be people who spend their time ensuring that other people do not take things without paying for them. That is normal in a profit oriented society, but a waste of human labour in socialism.

Free trade

Free trade is a free market policy followed by some international markets in which countries' governments do not restrict imports from, or exports to, other countries. In government, free trade is predominately advocated by political parties that hold right-wing economic positions, while economically left-wing political parties generally support protectionism.

Most nations are today members of the World Trade Organization (WTO) multilateral trade agreements. Free trade is additionally exemplified by the European Economic Area and the Mercosur, which have established open markets. However, most governments still impose some protectionist policies that are intended to support local employment, such as applying tariffs to imports or subsidies to exports. Governments may also restrict free trade to limit exports of natural resources. Other barriers that may hinder trade include import quotas, taxes, and non-tariff barriers, such as regulatory legislation.

There is a broad consensus among economists that protectionism has a negative effect on economic growth and economic welfare, while free trade and the reduction of trade barriers to trade has a positive effect on economic growth. However, liberalization of trade can cause significant and unequally distributed losses, and the economic dislocation of workers in import-competing sectors.

Features of free trade

Free trade policies generally promote the following features:

- Trade of goods without taxes (including tariffs) or other trade barriers (e.g., quotas on imports or subsidies for producers)
- Trade in services without taxes or other trade barriers
- The absence of "trade-distorting" policies (such as taxes, subsidies, regulations, or laws) that give some firms, households, or factors of production an advantage over others
- Unregulated access to markets
- Unregulated access to market information
- Inability of firms to distort markets through government-imposed monopoly or oligopoly power
- Trade agreements which encourage free trade.

Two simple ways to understand the proposed benefits of free trade are through David Ricardo's theory of comparative advantage and by analyzing the impact of a tariff or import quota. An economic analysis using the law of supply and demand and the economic effects of a tax can be used to show the theoretical benefits and disadvantages of free trade.

Most economists would recommend that even developing nations should set their tariff rates quite low, but the economist Ha-Joon Chang, a proponent of industrial policy, believes higher levels may be justified in developing nations because the productivity gap between them and developed nations today is much higher than what developed nations faced when they were at a similar level of technological development. Underdeveloped nations today, Chang believes, are weak players in a much more competitive system. Counterarguments to Chang's point of view are that the developing countries are able to adopt technologies from abroad, whereas developed nations had to create new technologies themselves, and that developing countries can sell to export markets far richer than any that existed in the 19th century.

If the chief justification for a tariff is to stimulate infant industries, it must be high enough to allow domestic manufactured goods to compete with imported goods in order to be successful. This theory, known as import substitution industrialization, is largely considered ineffective for currently developing nations.

Trade diversion

According to mainstream economic theory, the selective application of free trade agreements to some countries and tariffs on others can lead to economic inefficiency through the process of trade diversion. It is economically efficient for a good to be produced by the country which is the lowest cost producer, but this does not always take place if a high cost producer has a free trade agreement while the low cost producer faces a high tariff. Applying free trade to the high cost producer (and not the low cost producer as well) can lead to trade diversion and a net economic loss. This is why many economists place such high importance on negotiations for global tariff reductions, such as the Doha Round.

Opinion of economists

The literature analysing the economics of free trade is extremely rich with extensive work having been done on the theoretical and empirical effects. Though it creates winners and losers, the broad consensus among economists is that free trade is a large and unambiguous net gain for society. In a 2006 survey of American economists (83 responders), "87.5% agree that the U.S. should eliminate remaining tariffs and other

barriers to trade" and "90.1% disagree with the suggestion that the U.S. should restrict employers from outsourcing work to foreign countries."

Quoting Harvard economics professor N. Gregory Mankiw, "Few propositions command as much consensus among professional economists as that open world trade increases economic growth and raises living standards." In a survey of leading economists, none disagreed with the notion that "freer trade improves productive efficiency and offers consumers better choices, and in the long run these gains are much larger than any effects on employment."

Most economists would agree that although increasing returns to scale might mean that certain industry could settle in a geographical area without any strong economic reason derived from comparative advantage, this is not a reason to argue against free trade because the absolute level of output enjoyed by both "winner" and "loser" will increase with the "winner" gaining more than the "loser" but both gaining more than before in an absolute level.

The notion of a free trade system encompassing multiple sovereign states originated in a rudimentary form in 16th century Imperial Spain. American jurist Arthur Nussbaum noted that Spanish theologian Francisco de Vitoria was "the first to set forth the notions (though not the terms) of freedom of commerce and freedom of the seas." Vitoria made the case under principles of *jus gentium*. However, it was two early British economists Adam Smith and David Ricardo who later developed the idea of free trade into its modern and recognizable form.

Economists who advocated free trade believed trade was the reason why certain civilizations prospered economically. Adam Smith, for example, pointed to increased trading as being the reason for the flourishing of not just Mediterranean cultures such as Egypt, Greece, and Rome, but also of Bengal (East India) and China. The great prosperity of the Netherlands after throwing off Spanish Imperial rule and pursuing a policy of free trade made the free trade/mercantilist dispute the most important question in economics for centuries. Free trade policies have battled with mercantilist, protectionist, isolationist, communist, populist, and other policies over the centuries.

The Ottoman Empire had liberal free trade policies by the 18th century, with origins in capitulations of the Ottoman Empire, dating back to the first commercial treaties signed with France in 1536 and taken further with capitulations in 1673, in 1740 which lowered duties to only 3% for imports and exports, and in 1790. Ottoman free trade policies were praised by British economists advocating free trade, such as J. R.

McCulloch in his *Dictionary of Commerce* (1834), but criticized by British politicians opposing free trade, such as prime minister Benjamin Disraeli, who cited the Ottoman Empire as "an instance of the injury done by unrestrained competition" in the 1846 Corn Laws debate, arguing that it destroyed what had been "some of the finest manufactures of the world" in 1812.

Trade in colonial America was regulated by the British mercantile system through the Acts of Trade and Navigation. Until the 1760s, few colonists openly advocated for free trade, in part because regulations were not strictly enforced—New England was famous for smuggling—but also because colonial merchants did not want to compete with foreign goods and shipping. According to historian Oliver Dickerson, a desire for free trade was not one of the causes of the American Revolution. "The idea that the basic mercantile practices of the eighteenth century were wrong," wrote Dickerson, "was not a part of the thinking of the Revolutionary leaders".

Free trade came to what would become the United States as a result of American Revolutionary War. After the British Parliament issued the Prohibitory Act, blockading colonial ports, the Continental Congress responded by effectively declaring economic independence, opening American ports to foreign trade on April 6, 1776. According to historian John W. Tyler, "Free trade had been forced on the Americans, like it or not."

In March 1801 the Pope Pius VII ordered some liberalization of trade to face the economic crisis in the Papal States with the *Motu Proprio* "Le più colte"; despite of this, the export of national corn was forbidden to ensure the food for the State.

In Britain, free trade became a central principle practiced by the repeal of the Corn Laws in 1846. Large-scale agitation was sponsored by the Anti-Corn Law League. Under the Treaty of Nanking, China opened five treaty ports to world trade in 1843. The first free trade agreement, the Cobden-Chevalier Treaty, was put in place in 1860 between Britain and France, which led to successive agreements between other countries in Europe.

Many classical liberals, especially in 19th and early 20th century Britain (e.g. John Stuart Mill) and in the United States for much of the 20th century (e.g., Henry Ford and Secretary of State Cordell Hull), believed that free trade promoted peace. Woodrow Wilson included free-trade rhetoric in his "Fourteen Points" speech of 1918:

The program of the world's peace, therefore, is our program; and that program, the only possible program, all we see it, is this: [...]

3. The removal, so far as possible, of all economic barriers and the establishment of equality of trade conditions among all the nations consenting to the peace and associating themselves for its maintenance.

According to economic historian Douglas Irwin, a common myth about U.S. trade policy is that low tariffs harmed American manufacturers in the early 19th century and then that high tariffs made the United States into a great industrial power in the late 19th century. A review by the *Economist* of Irwin's 2017 book *Clashing over Commerce: A History of US Trade Policy* notes :

Political dynamics would lead people to see a link between tariffs and the economic cycle that was not there. A boom would generate enough revenue for tariffs to fall, and when the bust came pressure would build to raise them again. By the time that happened, the economy would be recovering, giving the impression that tariff cuts caused the crash and the reverse generated the recovery. Mr Irwin also methodically debunks the idea that protectionism made America a great industrial power, a notion believed by some to offer lessons for developing countries today. As its share of global manufacturing powered from 23% in 1870 to 36% in 1913, the admittedly high tariffs of the time came with a cost, estimated at around 0.5% of GDP in the mid-1870s. In some industries, they might have sped up development by a few years. But American growth during its protectionist period was more to do with its abundant resources and openness to people and ideas.

According to Paul Bairoch, since the end of the 18th century, the United States has been "the homeland and bastion of modern protectionism". In fact, the United States never adhered to free trade until 1945. For the most part, the "Jeffersonians" strongly opposed it. In the 19th century, statesmen such as Senator Henry Clay continued Hamilton's themes within the Whig Party under the name "American System." The opposition Democratic Party contested several elections throughout the 1830s, 1840s, and 1850s in part over the issue of the tariff and protection of industry.

In the U.S., the Democratic Party favored moderate tariffs used for government revenue only, while the Whigs favored higher protective tariffs to protect favored industries. The economist Henry Charles Carey became a leading proponent of the "American System" of economics. This mercantilist "American System" was opposed by the Democratic Party of Andrew Jackson, Martin Van Buren, John Tyler, James K. Polk, Franklin Pierce, and James Buchanan.

The fledgling Republican Party led by Abraham Lincoln, who called himself a "Henry Clay tariff Whig", strongly opposed free trade and implemented a 44-percent tariff during the Civil War—in part to pay for railroad subsidies and for the war effort, and to protect favored industries. William McKinley (later to become President of the

United States) stated the stance of the Republican Party (which won every election for President from 1868 until 1912, except the two non-consecutive terms of Grover Cleveland) as thus:

Under free trade the trader is the master and the producer the slave. Protection is but the law of nature, the law of self-preservation, of self-development, of securing the highest and best destiny of the race of man. [It is said] that protection is immoral.... Why, if protection builds up and elevates 63,000,000 [the U.S. population] of people, the influence of those 63,000,000 of people elevates the rest of the world. We cannot take a step in the pathway of progress without benefitting mankind everywhere. Well, they say, 'Buy where you can buy the cheapest'.... Of course, that applies to labor as to everything else. Let me give you a maxim that is a thousand times better than that, and it is the protection maxim: 'Buy where you can pay the easiest.' And that spot of earth is where labor wins its highest rewards.

During the interwar period, economic protectionism took hold in the United States, most famously in the form of the Smoot-Hawley Tariff Act, which is credited by economists with the prolonging and worldwide propagation of the Great Depression. From 1934, trade liberalization began to take place through the Reciprocal Trade Agreements Act.

Post-World War II

Since the end of World War II, in part due to industrial size and the onset of the Cold War, the United States has often been a proponent of reduced tariff-barriers and free trade. The U.S. helped establish the General Agreement on Tariffs and Trade (GATT) and later the World Trade Organization (WTO); although it had rejected an earlier version in the 1950s (International Trade Organization or ITO). Since the 1970s, U.S. governments have negotiated managed-trade agreements, such as the North American Free Trade Agreement (NAFTA) in the 1990s, the Dominican Republic-Central America Free Trade Agreement (CAFTA) in 2006, and a number of bilateral agreements (such as with Jordan).

In Europe, six countries formed the European Coal and Steel Community (ECSC) in 1951 which became the European Economic Community (EEC) in 1958. Two core objectives of the EEC were the development of a common market, subsequently renamed the single market, and establishing a customs union between its member states. After expanding its membership, the EEC became the European Union (EU) in 1993. The European Union, now the world's largest single market, has concluded free trade agreements with many countries around the world.

Now days Most countries in the world are members of the World Trade Organization which limits in certain ways but does not eliminate tariffs and other trade barriers. Most countries are also members of regional free trade areas that lower trade barriers among participating countries. The EU and the US are negotiating a Transatlantic Trade and Investment Partnership. Initially led by the U.S., twelve countries that have borders on the Pacific Ocean are currently in private negotiations around the Trans-Pacific Partnership, which is being touted by the negotiating countries as a free trade policy. In January 2017, the United States pulled out of negotiations for the Trans-Pacific Partnership.

The politics of free trade

The relative costs, benefits and beneficiaries of free trade are debated by academics, governments and interest groups.

Arguments for protectionism fall into the economic category (trade hurts the economy or groups in the economy) or the moral category (the effects of trade might help the economy, but have ill effects in other areas); a general argument against free trade is that it is colonialism or imperialism in disguise. The moral category is wide, including concerns of destroying infant industries and undermining long-run economic development, income inequality, environmental degradation, supporting child labor and sweatshops, race to the bottom, wage slavery, accentuating poverty in poor countries, harming national defense, and forcing cultural change.

Economic arguments against free trade criticize the assumptions or conclusions of economic theories. Sociopolitical arguments against free trade cite social and political effects that economic arguments do not capture, such as political stability, national security, human rights and environmental protection .

Free trade is often opposed by domestic industries that would have their profits and market share reduced by lower prices for imported goods. For example, if United States tariffs on imported sugar were reduced, U.S. sugar producers would receive lower prices and profits, while U.S. sugar consumers would spend less for the same amount of sugar because of those same lower prices. The economic theory of David Ricardo holds that consumers would necessarily gain more than producers would lose. Since each of those few domestic sugar producers would lose a lot while each of a great number of consumers would gain only a little, domestic producers are more likely to mobilize against the lifting of tariffs. More generally, producers often favor domestic subsidies and tariffs on imports in their home countries, while objecting to subsidies and tariffs in their export markets.

Socialists frequently oppose free trade on the ground that it allows maximum exploitation of workers by capital. For example, Karl Marx wrote in *The Communist Manifesto*, "The bourgeoisie... has set up that single, unconscionable freedom – free trade. In one word, for exploitation, veiled by religious and political illusions, it has substituted naked, shameless, direct, brutal exploitation." Nonetheless, Marx did favor free trade—*solely* because he felt that it would hasten the social revolution.

"Free trade" is opposed by many anti-globalization groups, based on their assertion that free trade agreements generally do not increase the economic freedom of the poor or the working class, and frequently make them poorer. Where the foreign supplier allows de facto exploitation of labor, domestic free-labor is unfairly forced to compete with the foreign exploited labor. To this extent, free trade is seen as an end-run around workers' rights and laws that protect individual liberty.

Some opponents of free trade favor free trade theory but oppose free trade *agreements* as applied. Some opponents of NAFTA see the agreement as being materially harmful to the common people, but some of the arguments are actually against the particulars of government-managed trade, rather than against free trade *per se*. For example, it is argued that it would be wrong to let subsidized corn from the U.S. into Mexico freely under NAFTA at prices well below production cost (dumping) because of its ruinous effects to Mexican farmers. Of course, such subsidies violate free trade theory, so this argument is not actually against the principle of free trade, but rather its selective implementation.

Research shows that support for trade restrictions is highest among respondents with the lowest levels of education. The authors find "that the impact of education on how voters' think about trade and globalization has more to do with exposure to economic ideas and information about the aggregate and varied effects of these economic phenomena, than it does with individual calculations about how trade affects personal income or job security. This is not to say that the latter types of calculations are not important in shaping individuals' views of trade—just that they are not being manifest in the simple association between education and support for trade openness." A 2017 study found that individuals whose occupations are routine-task-intensive and who do jobs that are offshorable are more likely to be protectionist .

Research suggests that attitudes towards free trade do not necessarily reflect individuals' self-interests.

It has long been argued that free trade is a form of colonialism or imperialism, a position taken by various proponents of economic nationalism and the school of mercantilism. In the 19th century these criticized British calls for free trade as cover

for British Empire, notably in the works of American Henry Clay, architect of the American System and by German American economist Friedrich List.

More recently, Ecuadorian President Rafael Correa has denounced the "sophistry of free trade" in an introduction he wrote for a book titled *The Hidden Face of Free Trade Accords*, written in part by Correa's current Energy Minister Alberto Acosta. Citing as his source the book *Kicking Away the Ladder*, written by Ha-Joon Chang, Correa identified the difference between an "American system" opposed to a "British System" of free trade. The latter, he says, was explicitly viewed by the Americans as "part of the British imperialist system." According to Correa, Chang showed that it was Treasury Secretary Alexander Hamilton, and not Friedrich List, who was the first to present a systematic argument defending industrial protectionism .

Finance

Finance is a field that deals with the study of investments. It includes the dynamics of assets and liabilities over time under conditions of different degrees of uncertainty and risk. Finance can also be defined as the science of money management. Market participants aim to price assets based on their risk level, fundamental value, and their expected rate of return. Finance can be broken into three sub-categories: public finance, corporate finance and personal finance.

Questions in personal finance revolve around:

- Protection against unforeseen personal events, as well as events in the wider economies
- Transference of family wealth across generations (bequests and inheritance)
- Effects of tax policies (tax subsidies or penalties) management of personal finances
- Effects of credit on individual financial standing
- Development of a savings plan or financing for large purchases (auto, education, home)
- Planning a secure financial future in an environment of economic instability

Personal finance may involve paying for education, financing durable goods such as real estate and cars, buying insurance, e.g. health and property insurance, investing and saving for retirement.

Personal finance may also involve paying for a loan, or debt obligations. The six key areas of personal financial planning, as suggested by the Financial Planning Standards Board, are:

1. **Financial position:** is concerned with understanding the personal resources available by examining net worth and household cash flows. Net worth is a person's balance sheet, calculated by adding up all assets under that person's control, minus all liabilities of the household, at one point in time. Household cash flows total up all from the expected sources of income within a year, minus all expected expenses within the same year. From this analysis, the financial planner can determine to what degree and in what time the personal goals can be accomplished.
2. **Adequate protection:** the analysis of how to protect a household from unforeseen risks. These risks can be divided into the following: liability, property, death, disability, health and long term care. Some of these risks may

be self-insurable, while most will require the purchase of an insurance contract. Determining how much insurance to get, at the most cost effective terms requires knowledge of the market for personal insurance. Business owners, professionals, athletes and entertainers require specialized insurance professionals to adequately protect themselves. Since insurance also enjoys some tax benefits, utilizing insurance investment products may be a critical piece of the overall investment planning.

3. **Tax planning:** typically the income tax is the single largest expense in a household. Managing taxes is not a question of if you will pay taxes, but when and how much. Government gives many incentives in the form of tax deductions and credits, which can be used to reduce the lifetime tax burden. Most modern governments use a progressive tax. Typically, as one's income grows, a higher marginal rate of tax must be paid. Understanding how to take advantage of the myriad tax breaks when planning one's personal finances can make a significant impact in which it can later save you money in the long term.
4. **Investment and accumulation goals:** planning how to accumulate enough money – for large purchases and life events – is what most people consider to be financial planning. Major reasons to accumulate assets include purchasing a house or car, starting a business, paying for education expenses, and saving for retirement. Achieving these goals requires projecting what they will cost, and when you need to withdraw funds that will be necessary to be able to achieve these goals. A major risk to the household in achieving their accumulation goal is the rate of price increases over time, or inflation. Using net present value calculators, the financial planner will suggest a combination of asset earmarking and regular savings to be invested in a variety of investments. In order to overcome the rate of inflation, the investment portfolio has to get a higher rate of return, which typically will subject the portfolio to a number of risks. Managing these portfolio risks is most often accomplished using asset allocation, which seeks to diversify investment risk and opportunity. This asset allocation will prescribe a percentage allocation to be invested in stocks (either preferred stock or common stock), bonds (for example mutual bonds or government bonds, or corporate bonds), cash and alternative investments. The allocation should also take into consideration the personal risk profile of every investor, since risk attitudes vary from person to person.
5. **Retirement planning** is the process of understanding how much it costs to live at retirement, and coming up with a plan to distribute assets to meet any income shortfall. Methods for retirement plans include taking advantage of government allowed structures to manage tax liability including: individual (IRA) structures, or employer sponsored retirement plans, annuities and life insurance products.

6. **Estate planning** involves planning for the disposition of one's assets after death. Typically, there is a tax due to the state or federal government at one's death. Avoiding these taxes means that more of one's assets will be distributed to one's heirs. One can leave one's assets to family, friends or charitable groups.

Corporate finance deals with the sources funding and the capital structure of corporations, the actions that managers take to increase the value of the firm to the shareholders, and the tools and analysis used to allocate financial resources. Although it is in principle different from managerial finance which studies the financial management of all firms, rather than corporations alone, the main concepts in the study of corporate finance are applicable to the financial problems of all kinds of firms. Corporate finance generally involves balancing risk and profitability, while attempting to maximize an entity's assets, net incoming cash flow and the value of its stock, and generically entails three primary areas of capital resource allocation. In the first, "capital budgeting", management must choose which "projects" (if any) to undertake. The discipline of capital budgeting may employ standard business valuation techniques or even extend to real options valuation. The second, "sources of capital" relates to how these investments are to be funded: investment capital can be provided through different sources, such as by shareholders, in the form of equity (privately or via an initial public offering), creditors, often in the form of bonds, and the firm's operations (cash flow). Short-term funding or working capital is mostly provided by banks extending a line of credit. The balance between these elements forms the company's capital structure. The third, "the dividend policy", requires management to determine whether any unappropriated profit (excess cash) is to be retained for future investment / operational requirements, or instead to be distributed to shareholders, and if so, in what form. Short term financial management is often termed "working capital management", and relates to cash-, inventory- and debtorsmanagement.

Corporate finance also includes within its scope business valuation, stock investing, or investment management. An investment is an acquisition of an asset in the hope that it will maintain or increase its value over time that will in hope give back a higher rate of return when it comes to disbursing dividends. In investment management – in choosing a portfolio – one has to use financial analysis to determine *what*, *how much* and *when* to invest. To do this, a company must:

- Identify relevant objectives and constraints: institution or individual goals, time horizon, risk aversion and tax considerations;
- Identify the appropriate strategy: active versus passive hedging strategy
- Measure the portfolio performance
- Financial management overlaps with the financial function of the accounting profession. However, financial accounting is the reporting of historical

financial information, while financial management is concerned with the allocation of capital resources to increase a firm's value to the shareholders and increase their rate of return on the investments.

- Financial risk management, an element of corporate finance, is the practice of creating and protecting economic value in a firm by using financial instruments to manage exposure to risk, particularly credit risk and market risk. (Other risk types include foreign exchange, shape, volatility, sector, liquidity, inflation risks, etc.) It focuses on when and how to hedge using financial instruments; in this sense it overlaps with financial engineering. Similar to general risk management, financial risk management requires identifying its sources, measuring it and formulating plans to address these, and can be qualitative and quantitative. In the banking sector worldwide, the Basel Accords are generally adopted by internationally active banks for tracking, reporting and exposing operational, credit and market risks.

Financial services

An entity whose income exceeds its expenditure can lend or invest the excess income to help that excess income produce more income in the future. Though on the other hand, an entity whose income is less than its expenditure can raise capital by borrowing or selling equity claims, decreasing its expenses, or increasing its income. The lender can find a borrower—a financial intermediary such as a bank—or buy notes or bonds (corporate bonds, government bonds, or mutual bonds) in the bond market. The lender receives interest, the borrower pays a higher interest than the lender receives, and the financial intermediary earns the difference for arranging the loan.

A bank aggregates the activities of many borrowers and lenders. A bank accepts deposits from lenders, on which it pays interest. The bank then lends these deposits to borrowers. Banks allow borrowers and lenders, of different sizes, to coordinate their activity.

Finance is used by individuals (personal finance), by governments (public finance), by businesses (corporate finance) and by a wide variety of other organizations such as schools and non-profit organizations. In general, the goals of each of the above activities are achieved through the use of appropriate financial instruments and methodologies, with consideration to their institutional setting.

Finance is one of the most important aspects of business management and includes analysis related to the use and acquisition of funds for the enterprise.

In corporate finance, a company's capital structure is the total mix of financing methods it uses to raise funds. One method is *debt financing*, which includes bank loans and bond sales. Another method is equity financing – the sale of stock by a company to investors, the original shareholders (they own a portion of the business) of a share. Ownership of a share gives the shareholder certain contractual rights and powers, which typically include the right to receive declared dividends and to vote the proxy on important matters (e.g., board elections). The owners of both bonds (either government bonds or corporate bonds) and stock (whether its preferred stock or common stock), may be institutional investors – financial institutions such as investment banks and pension funds or private individuals, called private investors or *retail investors*.

Public finance

Public finance describes finance as related to sovereign states and sub-national entities (states/provinces, counties, municipalities, etc.) and related public entities (e.g. school districts) or agencies. It usually encompasses a long-term strategic perspective regarding investment decisions that affect public entities. These long-term strategic periods usually encompass five or more years. Public finance is primarily concerned with:

- Identification of required expenditure of a public sector entity
- Source(s) of that entity's revenue
- The budgeting process
- Debt issuance (municipal bonds) for public works projects

Central banks, such as the Federal Reserve System banks in the United States and Bank of England in the United Kingdom, are strong players in public finance, acting as lenders of last resort as well as strong influences on monetary and credit conditions in the economy.

Capital

Capital, in the financial sense, is the money that gives the business the power to buy goods to be used in the production of other goods or the offering of a service. (Capital has two types of sources, equity and debt).

The deployment of capital is decided by the budget. This may include the objective of business, targets set, and results in financial terms, e.g., the target set for sale, resulting cost, growth, required investment to achieve the planned sales, and financing source for the investment.

A budget may be long term or short term. Long term budgets have a time horizon of 5–10 years giving a vision to the company; short term is an annual budget which is drawn to control and operate in that particular year.

Budgets will include proposed fixed asset requirements and how these expenditures will be financed. Capital budgets are often adjusted annually (done every year) and should be part of a longer-term Capital Improvements Plan.

A cash budget is also required. The working capital requirements of a business are monitored at all times to ensure that there are sufficient funds available to meet short-term expenses.

The cash budget is basically a detailed plan that shows all expected sources and uses of cash when it comes to spending it appropriately. The cash budget has the following six main sections:

1. **Beginning cash balance** – contains the last period's closing cash balance, in other words, the remaining cash of the last year.
2. **Cash collections** – includes all expected cash receipts (all sources of cash for the period considered, mainly sales)
3. **Cash disbursements** – lists all planned cash outflows for the period such as dividend, excluding interest payments on short-term loans, which appear in the financing section. All expenses that do not affect cash flow are excluded from this list (e.g. depreciation, amortization, etc.)
4. **Cash excess or deficiency** – a function of the cash needs and cash available. Cash needs are determined by the total cash disbursements plus the minimum cash balance required by company policy. If total cash available is less than cash needs, a deficiency exists.
5. **Financing** – discloses the planned borrowings and repayments of those planned borrowings, including interest.

Financial economics

Financial economics is the branch of economics studying the interrelation of financial variables, such as prices, interest rates and shares, as opposed to goods and services. Financial economics concentrates on influences of real economic variables on financial ones, in contrast to pure finance. It centres on managing risk in the context of the financial markets, and the resultant economic and financial models. It essentially explores how rational investors would apply risk and return to the problem of an investment policy. Here, the twin assumptions of rationality and market efficiency lead to modern portfolio theory (the CAPM), and to the Black–Scholes theory for option valuation; it further studies phenomena and models where

these assumptions do not hold, or are extended. "Financial economics", at least formally, also considers investment under "certainty" (Fisher separation theorem, "theory of investment value", Modigliani–Miller theorem) and hence also contributes to corporate finance theory. Financial econometrics is the branch of financial economics that uses econometric techniques to parameterize the relationships suggested.

Although closely related, the disciplines of economics and finance are distinct. The “economy” is a social institution that organizes a society’s production, distribution, and consumption of goods and services, all of which must be financed.

Financial mathematics

Financial mathematics is a field of applied mathematics, concerned with financial markets. The subject has a close relationship with the discipline of financial economics, which is concerned with much of the underlying theory that is involved in financial mathematics. Generally, mathematical finance will derive, and extend, the mathematical or numerical models suggested by financial economics. In terms of practice, mathematical finance also overlaps heavily with the field of computational finance (also known as financial engineering). Arguably, these are largely synonymous, although the latter focuses on application, while the former focuses on modelling and derivation . The field is largely focused on the modelling of derivatives, although other important subfields include insurance mathematics and quantitative portfolio problems.

Experimental finance

Experimental finance aims to establish different market settings and environments to observe experimentally and provide a lens through which science can analyze agents' behavior and the resulting characteristics of trading flows, information diffusion and aggregation, price setting mechanisms, and returns processes. Researchers in experimental finance can study to what extent existing financial economics theory makes valid predictions and therefore prove them, and attempt to discover new principles on which such theory can be extended and be applied to future financial decisions. Research may proceed by conducting trading simulations or by establishing and studying the behavior, and the way that these people act or react, of people in artificial competitive market-like settings.

Behavioral finance

Behavioral finance studies how the psychology of investors or managers affects financial decisions and markets when making a decision that can impact either

negatively or positively on one of their areas. Behavioral finance has grown over the last few decades to become central and very important to finance.

Behavioral finance includes such topics as:

1. Empirical studies that demonstrate significant deviations from classical theories.
2. Models of how psychology affects and impacts trading and prices
3. Forecasting based on these methods.
4. Studies of experimental asset markets and use of models to forecast experiments.

A strand of behavioral finance has been dubbed quantitative behavioral finance, which uses mathematical and statistical methodology to understand behavioral biases in conjunction with valuation. Some of these endeavors has been led by Gunduz Caginalp (Professor of Mathematics and Editor of Journal of Behavioral Finance during 2001-2004) and collaborators including Vernon Smith (2002 Nobel Laureate in Economics), David Porter, Don Balenovich, Vladimira Ilieva, Ahmet Duran). Studies by Jeff Madura, Ray Sturm and others have demonstrated significant behavioral effects in stocks and exchange traded funds. Among other topics, quantitative behavioral finance studies behavioral effects together with the non-classical assumption of the finiteness of assets.

Market liquidity

In business, economics or investment, **market liquidity** is a market's feature whereby an individual or firm can quickly purchase or sell an asset without causing a drastic change in the asset's price. Liquidity is about how big the trade-off is between the speed of the sale and the price it can be sold for. In a liquid market, the trade-off is mild: selling quickly will not reduce the price much. In a relatively illiquid market, selling it quickly will require cutting its price by some amount. Liquidity can be measured either based on trade volume relative to shares outstanding or based on the bid-ask spread or transactions costs of trading.

Money, or cash, is the most liquid asset, because it can be "sold" for goods and services instantly with no loss of value. There is no wait for a suitable buyer of the cash. There is no trade-off between speed and value. It can be used immediately to perform economic actions like buying, selling, or paying debt, meeting immediate wants and needs.

If an asset is moderately (or very) liquid, it has moderate (or high) liquidity. In an alternative definition, **liquidity** can mean the amount of cash and cash equivalents. If a business has moderate liquidity, it has a moderate amount of very liquid assets. If a business has sufficient liquidity, it has a sufficient amount of very liquid assets and the ability to meet its payment obligations.

An act of exchanging a less liquid asset for a more liquid asset is called **liquidation**. Often liquidation is trading the less liquid asset for cash, also known as selling it. An asset's liquidity can change. For the same asset, its liquidity can change through time or between different markets, such as in different countries. The change in the asset's liquidity is just based on the market liquidity for the asset at the particular time or in the particular country, etc. The liquidity of a product can be measured as how often it is bought and sold. Liquidity can be enhanced through share buy-backs or repurchases.

Liquidity is defined formally in many accounting regimes and has in recent years been more strictly defined. For instance, the US Federal Reserve intends to apply quantitative liquidity requirements based on Basel III liquidity rules as of fiscal 2012. Bank directors will also be required to know of, and approve, major liquidity risks personally. Other rules require diversifying counterparty risk and portfolio stress testing against extreme scenarios, which tend to identify unusual market liquidity conditions and avoid investments that are particularly vulnerable to sudden liquidity shifts.

A liquid asset has some or all of the following features: It can be sold rapidly, with minimal loss of value, anytime within market hours. The essential characteristic of a liquid market is that there are always ready and willing buyers and sellers. It is similar to, but distinct from, market depth, which relates to the trade-off between quantity being sold and the price it can be sold for, rather than the liquidity trade-off between speed of sale and the price it can be sold for. A market may be considered both deep and liquid if there are ready and willing buyers and sellers in large quantities.

An illiquid asset is an asset which is not readily salable (without a drastic price reduction, and sometimes not at any price) due to uncertainty about its value or the lack of a market in which it is regularly traded. The mortgage-related assets which resulted in the subprime mortgage crisis are examples of illiquid assets, as their value was not readily determinable despite being secured by real property. Before the crisis, they had moderate liquidity because it was believed that their value was generally known.

Speculators and market makers are key contributors to the liquidity of a market or asset. Speculators are individuals or institutions that seek to profit from anticipated increases or decreases in a particular market price. Market makers seek to profit by charging for the immediacy of execution: either implicitly by earning a bid/ask spread or explicitly by charging execution commissions. By doing this, they provide the capital needed to facilitate the liquidity. The risk of illiquidity need not apply only to individual investments: whole portfolios are subject to market risk. Financial institutions and asset managers that oversee portfolios are subject to what is called "structural" and "contingent" liquidity risk. Structural liquidity risk, sometimes called funding liquidity risk, is the risk associated with funding asset portfolios in the normal course of business. Contingent liquidity risk is the risk associated with finding additional funds or replacing maturing liabilities under potential, future stressed market conditions. When a central bank tries to influence the liquidity of money, this process is known as open market operations.

The market liquidity of assets affects their prices and expected returns. Theory and empirical evidence suggests that investors require higher return on assets with lower market liquidity to compensate them for the higher cost of trading these assets. That is, for an asset with given cash flow, the higher its market liquidity, the higher its price and the lower is its expected return. In addition, risk-averse investors require higher expected return if the asset's market-liquidity risk is greater. This risk involves the exposure of the asset return to shocks in overall market liquidity, the exposure of the asset own liquidity to shocks in market liquidity and the effect of market return on the asset's own liquidity. Here too, the higher the liquidity risk, the higher the expected return on the asset or the lower is its price.

One example of this is a comparison of assets with and without a liquid secondary market. The liquidity discount is the reduced promised yield or expected a return for such assets, like the difference between newly issued U.S. Treasury bonds compared to off the run treasuries with the same term to maturity. Initial buyers know that other investors are less willing to buy off-the-run treasuries, so the newly issued bonds have a higher price .

In the futures markets, there is no assurance that a liquid market may exist for offsetting a commodity contract at all times. Some future contracts and specific delivery months tend to have increasingly more trading activity and have higher liquidity than others. The most useful indicators of liquidity for these contracts are the trading volume and open interest.

There is also dark liquidity, referring to transactions that occur off-exchange and are therefore not visible to investors until after the transaction is complete. It does not contribute to public price discovery.

In banking, liquidity is the ability to meet obligations when they come due without incurring unacceptable losses. Managing liquidity is a daily process requiring bankers to monitor and project cash flows to ensure adequate liquidity is maintained. Maintaining a balance between short-term assets and short-term liabilities is critical. For an individual bank, clients' deposits are its primary liabilities (in the sense that the bank is meant to give back all client deposits on demand), whereas reserves and loans are its primary assets (in the sense that these loans are owed to the bank, not by the bank). The investment portfolio represents a smaller portion of assets, and serves as the primary source of liquidity. Investment securities can be liquidated to satisfy deposit withdrawals and increased loan demand. Banks have several additional options for generating liquidity, such as selling loans, borrowing from other banks, borrowing from a central bank, such as the US Federal Reserve bank, and raising additional capital. In a worst-case scenario, depositors may demand their funds when the bank is unable to generate adequate cash without incurring substantial financial losses. In severe cases, this may result in a bank run. Most banks are subject to legally mandated requirements intended to help avoid a liquidity crisis.

Banks can generally maintain as much liquidity as desired because bank deposits are insured by governments in most developed countries. A lack of liquidity can be remedied by raising deposit rates and effectively marketing deposit products. However, an important measure of a bank's value and success is the cost of liquidity. A bank can attract significant liquid funds. Lower costs generate stronger profits, more stability, and more confidence among depositors, investors, and regulators.

In the market, liquidity has a slightly different meaning, although still tied to how easily assets, in this case shares of stock, can be converted to cash. The market for a stock is said to be liquid if the shares can be rapidly sold and the act of selling has little impact on the stock's price. Generally, this translates to where the shares are traded and the level of interest that investors have in the company. Another way to judge liquidity in a company's stock is to look at the bid/ask spread. For liquid stocks, such as Microsoft or General Electric, the spread is often just a few pennies – much less than 1% of the price. For illiquid stocks, the spread can be much larger, amounting to a few percent of the trading price. In today's stock market, high-frequency trading firms purport of themselves to contribute to nearly 50% of all liquidity.

Liquidity positively impacts the stock market. When stock prices rise, it is said to be due to a confluence of extraordinarily high levels of liquidity on household and business balance sheets, combined with a simultaneous normalization of liquidity preferences. On the margin, this drives a demand for equity investments.

Market failure

In economics, **market failure** is a situation in which the allocation of goods and services is not efficient, often leading to a net social welfare loss. Market failures can be viewed as scenarios where individuals' pursuit of pure self-interest leads to results that are not efficient – that can be improved upon from the societal point of view. The first known use of the term by economists was in 1958, but the concept has been traced back to the Victorian philosopher Henry Sidgwick.

Market failures are often associated with time-inconsistent preferences, information asymmetries, non-competitive markets, principal–agent problems, or externalities.

Public goods are *both* non-rival and non-excludable (i.e., public goods are not only non-excludable) thus existence of a market failure is often the reason that self-regulatory organizations, governments or supra-national institutions intervene in a particular market. Economists, especially microeconomists, are often concerned with the causes of market failure and possible means of correction. Such analysis plays an important role in many types of public policy decisions and studies. However, government policy interventions, such as taxes, subsidies, bailouts, wage and price controls, and regulations (including poorly implemented attempts to correct market failure), may also lead to an inefficient allocation of resources, sometimes called government failure.

Given the tension between, on the one hand, the undeniable costs to society caused by market failure, and on the other hand, the potential that attempts to mitigate these costs could lead to even greater costs from "government failure", there is sometimes a choice between imperfect outcomes, i.e. imperfect market outcomes with or without government interventions. But either way, if a market failure exists the outcome is not Pareto efficient. Most mainstream economists believe that there are circumstances (like building codes or endangered species) in which it is possible for government or other organizations to improve the inefficient market outcome. Several heterodox schools of thought disagree with this as a matter of principle.

An *ecological* market failure exists when human activity in a market economy is exhausting critical non-renewable resources, disrupting fragile ecosystems services, or overloading biospheric waste absorption capacities. In none of these cases does the criterion of Pareto efficiency obtain.

Different economists have different views about what events are the sources of market failure. Mainstream economic analysis widely accepts that a market failure can occur for three main reasons: if the market is "monopolised" or a small group of

businesses hold significant market power, if production of the good or service results in an externality, or if the good or service is a "public good".

Agents in a market can gain market power, allowing them to block other mutually beneficial gains from trade from occurring. This can lead to inefficiency due to imperfect competition, which can take many different forms, such as monopolies, monopsonies, or monopolistic competition, if the agent does not implement perfect price discrimination.

It is then a further question about what circumstances allow a monopoly to arise. In some cases, monopolies can maintain themselves where there are "barriers to entry" that prevent other companies from effectively entering and competing in an industry or market. Or there could exist significant first-mover advantages in the market that make it difficult for other firms to compete. A natural monopoly is a firm whose per-unit cost decreases as it increases output; in this situation it is most efficient (from a cost perspective) to have only a single producer of a good.

The nature of the goods

Non-excludability

Some markets can fail due to the nature of the goods being exchanged. For instance, goods can display the attributes of public goods or common goods, wherein sellers are unable to exclude non-buyers from using a product, as in the development of inventions that may spread freely once revealed. This can cause underinvestment because developers cannot capture enough of the benefits from success to make the development effort worthwhile. This can also lead to resource depletion in the case of common-pool resources, where, because use of the resource is rival but non-excludable, there is no incentive for users to conserve the resource. An example of this is a lake with a natural supply of fish: if people catch the fish faster than they can reproduce, then the fish population will dwindle until there are no fish left for future generations.

Externalities

A good or service could also have significant externalities, where gains or losses associated with the product, production or consumption of a product, differ from the private cost. These externalities can be innate to the methods of production or other conditions important to the market.

Traffic congestion is an example of market failure that incorporates both non-excludability and externality. Public roads are common resources that are available for

the entire population's use (non-excludable), and act as a complement to cars (the more roads there are, the more useful cars become). Because there is very low cost but high benefit to individual drivers in using the roads, the roads become congested, decreasing their usefulness to society. Furthermore, driving can impose hidden costs on society through pollution (externality). Solutions for this include public transportation, congestion pricing, tolls, and other ways of making the driver include the social cost in the decision to drive.

Perhaps the best example of the inefficiency associated with common/public goods and externalities is the environmental harm caused by pollution and overexploitation of natural resources.

The nature of the exchange

Some markets can fail due to the nature of their exchange. Markets may have significant transaction costs, agency problems, or informational asymmetry. Such incomplete markets may result in economic inefficiency but also a possibility of improving efficiency through market, legal, and regulatory remedies. From contract theory, decisions in transactions where one party has more or better information than the other is an asymmetry. This creates an imbalance of power in transactions which can sometimes cause the transactions to go awry. Examples of this problem are adverse selection and moral hazard. Most commonly, information asymmetries are studied in the context of principal–agent problems. George Akerlof, Michael Spence, and Joseph E. Stiglitz developed the idea and shared the 2001 Nobel Prize in Economics.

Bounded rationality

In *Models of Man*, Herbert A. Simon points out that most people are only partly rational, and are emotional/irrational in the remaining part of their actions. In another work, he states "boundedly rational agents experience limits in formulating and solving complex problems and in processing information" Simon describes a number of dimensions along which "classical" models of rationality can be made somewhat more realistic, while sticking within the vein of fairly rigorous formalization. These include:

- limiting what sorts of utility functions there might be.
- recognizing the costs of gathering and processing information.
- the possibility of having a "vector" or "multi-valued" utility function.

Simon suggests that economic agents employ the use of heuristics to make decisions rather than a strict rigid rule of optimization. They do this because of the complexity

of the situation, and their inability to process and compute the expected utility of every alternative action. Deliberation costs might be high and there are often other, concurrent economic activities also requiring decisions.

Coase theorem

The Coase theorem, developed by Ronald Coase and labeled as such by George Stigler, states that private transactions are efficient as long as property rights exist, only a small number of parties are involved, and transactions costs are low. Additionally, this efficiency will take place regardless of who owns the property rights. This theory comes from a section of Coase's Nobel prize-winning work *The Problem of Social Cost*. While the assumptions of low transactions costs and a small number of parties involved may not always be applicable in real-world markets, Coase's work changed the long-held belief that the owner of property rights was a major determining factor in whether or not a market would fail. The Coase theorem points out when one would expect the market to function properly even when there are externalities.

A market is an institution in which individuals or firms exchange not just commodities, but the *rights* to use them in particular ways for particular amounts of time. Markets are institutions which organize the *exchange of control* of commodities, where the nature of the control is defined by the property rights attached to the commodities.

As a result, agents' control over the uses of their commodities can be imperfect, because the system of rights which defines that control is incomplete. Typically, this falls into two generalized rights – *excludability* and *transferability*. Excludability deals with the ability of agents to control who uses their commodity, and for how long – and the related costs associated with doing so. Transferability reflects the right of agents to transfer the rights of use from one agent to another, for instance by selling or leasing a commodity, and the costs associated with doing so. If a given system of rights does not fully guarantee these at minimal (or no) cost, then the resulting distribution can be inefficient. Considerations such as these form an important part of the work of institutional economics. Nonetheless, views still differ on whether something displaying these attributes is meaningful without the information provided by the market price system.

Interpretations and policy examples

The above causes represent the mainstream view of what market failures mean and of their importance in the economy. This analysis follows the lead of the neoclassical school, and relies on the notion of Pareto efficiency, which can be in

the "public interest", as well as in interests of stakeholders with equity. This form of analysis has also been adopted by the Keynesian or new Keynesian schools in modern macroeconomics, applying it to Walrasian models of general equilibrium in order to deal with failures to attain full employment, or the non-adjustment of prices and wages.

Policies to prevent market failure are already commonly implemented in the economy. For example, to prevent information asymmetry, members of the New York Stock Exchange agree to abide by its rules in order to promote a fair and orderly market in the trading of listed securities. The members of the NYSE presumably believe that each member is individually better off if every member adheres to its rules – even if they have to forego money-making opportunities that would violate those rules.

A simple example of policies to address market power is government antitrust policies. As an additional example of externalities, municipal governments enforce building codes and license tradesmen to mitigate the incentive to use cheaper (but more dangerous) construction practices, ensuring that the total cost of new construction includes the (otherwise external) cost of preventing future tragedies. The voters who elect municipal officials presumably feel that they are individually better off if everyone complies with the local codes, even if those codes may increase the cost of construction in their communities.

CITES is an international treaty to protect the world's common interest in preserving endangered species – a classic "public good" – against the private interests of poachers, developers and other market participants who might otherwise reap monetary benefits without bearing the known and unknown costs that extinction could create. Even without knowing the true cost of extinction, the signatory countries believe that the societal costs far outweigh the possible private gains that they have agreed to forego.

Some remedies for market failure can resemble other market failures. For example, the issue of systematic underinvestment in research is addressed by the patent system that creates artificial monopolies for successful inventions.

Objections

Public choice

Economists such as Milton Friedman from the Chicago school and others from the Public Choice school, argue that market failure does not necessarily imply that

government should attempt to solve market failures, because the costs of government failure might be worse than those of the market failure it attempts to fix. This failure of government is seen as the result of the inherent problems of democracy and other forms of government perceived by this school and also of the power of special-interest groups (rent seekers) both in the private sector and in the government bureaucracy. Conditions that many would regard as negative are often seen as an effect of subversion of the free market by coercive government intervention. Beyond philosophical objections, a further issue is the practical difficulty that any single decision maker may face in trying to understand (and perhaps predict) the numerous interactions that occur between producers and consumers in any market.

Austrian

Some advocates of *laissez-faire* capitalism, including many economists of the Austrian School, argue that there is no such phenomenon as "market failure". Israel Kirzner states that, "Efficiency for a social system means the efficiency with which it permits its individual members to achieve their individual goals." Inefficiency only arises when means are chosen by individuals that are inconsistent with their desired goals. This definition of efficiency differs from that of Pareto efficiency, and forms the basis of the theoretical argument against the existence of market failures. However, providing that the conditions of the first welfare theorem are met, these two definitions agree, and give identical results. Austrians argue that the market tends to eliminate its inefficiencies through the process of entrepreneurship driven by the profit motive; something the government has great difficulty detecting, or correcting.

Marxian

Objections also exist on more fundamental bases, such as that of equity, or Marxian analysis. Colloquial uses of the term "market failure" reflect the notion of a market "failing" to provide some desired attribute different from efficiency – for instance, high levels of inequality can be considered a "market failure", yet are not Pareto inefficient, and so would not be considered a market failure by mainstream economics. In addition, many Marxian economists would argue that the system of individual property rights is a fundamental problem in itself, and that resources should be allocated in another way entirely. This is different from concepts of "market failure" which focuses on specific situations – typically seen as "abnormal" – where markets have inefficient outcomes. Marxists, in contrast, would say that markets have inefficient and democratically unwanted outcomes – viewing market failure as an inherent feature of any capitalist economy – and typically omit it from discussion, preferring to ration finite goods not exclusively through a price mechanism, but based upon need as determined by society expressed through the community.

Ecological

In ecological economics, the concept of externalities is considered a misnomer, since market agents are viewed as making their incomes and profits by systematically 'shifting' the social and ecological costs of their activities onto other agents, including future generations. Hence, externalities is a *modus operandi* of the market, not a failure: The market cannot exist without constantly 'failing'.

The fair and even allocation of non-renewable resources over time is a market failure issue of concern to ecological economics. This issue is also known as 'intergenerational fairness'. It is argued that the market mechanism fails when it comes to allocating the Earth's finite mineral stock fairly and evenly among present and future generations, as future generations are not, and cannot be, present on today's market. This is an instance of a market failure passed unrecognized by most mainstream economists, as the concept of Pareto efficiency is entirely static. Imposing government restrictions on the general level of activity in the economy may be the only way of bringing about a more fair and even intergenerational allocation of the mineral stock. Hence, Nicholas Georgescu-Roegen and Herman Daly, the two leading theorists in the field, have both called for the imposition of such restrictions: Georgescu-Roegen has proposed a minimal bioeconomic program, and Daly has proposed a comprehensive steady-state economy. However, Georgescu-Roegen, Daly, and other economists in the field agree that on a finite Earth, geologic limits will inevitably strain most fairness in the longer run, regardless of any present government restrictions: Any rate of extraction and use of the finite stock of non-renewable mineral resources will diminish the remaining stock left over for future generations to use.

Another ecological market failure is presented by the overutilisation of an otherwise renewable resource at a point in time, or within a short period of time. Such overutilisation usually occurs when the resource in question has poorly defined (or non-existing) property rights attached to it while too many market agents engage in activity simultaneously for the resource to be able to sustain it all. Examples range from over-fishing of fisheries and over-grazing of pastures to over-crowding of recreational areas in congested cities. This type of ecological market failure is generally known as the 'tragedy of the commons'. In this type of market failure, the principle of Pareto efficiency is violated the utmost, as *all* agents in the market are left worse off, while nobody are benefitting. It has been argued that the best way to remedy a 'tragedy of the commons'-type of ecological market failure is to establish enforceable property rights politically – only, this may be easier said than done.

The issue of anthropogenic global warming presents an overwhelming example of a 'tragedy of the commons'-type of ecological market failure: The

Earth's atmosphere may be regarded as a 'global common' exhibiting poorly defined (non-existing) property rights, and the waste absorption capacity of the atmosphere with regard to carbon dioxide is presently being heavily overloaded by a too large volume of emissions from the world economy. Historically, the fossil fuel dependence of the Industrial Revolution has unintentionally thrown mankind out of ecological equilibrium with the rest of the Earth's biosphere (including the atmosphere), and the market has failed to correct the situation ever since. Quite the opposite: The unrestricted market has been exacerbating this global state of ecological *dis*-equilibrium, and is expected to continue doing so well into the foreseeable future. This particular market failure may be remedied to some extent at the political level by the establishment of an international (or regional) cap and trade property rights system, where carbon dioxide emission permits are bought and sold among market agents.

The term 'uneconomic growth' describes a pervasive ecological market failure: The ecological costs of further economic growth in a so-called 'full-world economy' like the present world economy may exceed the immediate social benefits derived from this growth.

Rivalry

In economics, a good is said to be **rivalrous** or **rival** if its consumption by one consumer prevents simultaneous consumption by other consumers, or if consumption by one party reduces utility/ability to use to another. A good is considered **non-rivalrous** or **non-rival** if, for any level of production, the cost of providing it to a marginal (additional) individual is zero. A good can be placed along a continuum ranging from rivalrous to non-rivalrous. The same characteristic is sometimes referred to as **jointness of supply** or **subtractable** or **non-subtractable**.

Most tangible goods, both durable and nondurable, are rival goods. A hammer is a durable rival good. One person's use of the hammer presents a significant barrier to others who desire to use that hammer at the same time. However, the first user does not "use up" the hammer, meaning that some rival goods can still be shared through time. An apple is a nondurable rival good: once an apple is eaten, it is "used up" and can no longer be eaten by others. Non-tangible goods can also be rivalrous. Examples include the ownership of radio spectra and domain names. In more general terms, almost all private goods are rivalrous.

In contrast, non-rival goods may be consumed by one consumer without preventing simultaneous consumption by others. Most examples of non-rival goods are intangible. Broadcast television is an example of a non-rival good; when a consumer turns on a TV set, this does not prevent the TV in another consumer's house from working. The television itself is a rival good, but television broadcasts are non-rival goods. Other examples of non-rival goods include a beautiful scenic view, national defense, clean air, street lights, and public safety. More generally, most intellectual property is non-rival. In fact, certain types of intellectual property become *more* valuable as more people consume them (anti-rival). For example, the more people use a particular language, the more valuable that language becomes.

Non-rivalry does not imply that the total production costs are low, but that the *marginal* production costs are zero. In reality, few goods are completely non-rival as rivalry can emerge at certain levels. For instance, use of public roads, the Internet, or police/law courts is non-rival up to a certain capacity, after which congestion means that each additional user decreases speed for others. For that, recent economic theory views rivalry as a continuum, not as a binary category, where many goods are somewhere between the two extremes of completely rival and completely non-rival. A perfectly non-rival good can be consumed simultaneously by an unlimited number of consumers.

Goods that are both non-rival and non-excludable are called public goods. It is generally accepted by mainstream economists that the market mechanism will underprovide public goods, so these goods have to be produced by other means, including government provision.

Revenue

In accounting, **revenue** is the income that a business has from its normal business activities, usually from the sale of goods and services to customers. Revenue is also referred to as **sales** or **turnover**. Some companies receive revenue from interest, royalties, or other fees. Revenue may refer to business income in general, or it may refer to the amount, in a monetary unit, earned during a period of time, as in "Last year, Company X had revenue of \$42 million". Profits or net income generally imply total revenue minus total expenses in a given period. In accounting, in the balance statement it is a subsection of the Equity section and revenue increases equity, it is often referred to as the "top line" due to its position on the income statement at the very top. This is to be contrasted with the "bottom line" which denotes net income (gross revenues minus total expenses).

For non-profit organizations, annual revenue may be referred to as **gross receipts**. This revenue includes donations from individuals and corporations, support from government agencies, income from activities related to the organization's mission, and income from fundraising activities, membership dues, and financial securities such as stocks, bonds or investment funds.

In general usage, revenue is income received by an organization in the form of cash or cash equivalents. Sales revenue or revenues is income received from selling goods or services over a period of time. Tax revenue is income that a government receives from taxpayers.

In more formal usage, revenue is a calculation or estimation of periodic income based on a particular standard accounting practice or the rules established by a government or government agency. Two common accounting methods, cash basis accounting and accrual basis accounting, do not use the same process for measuring revenue. Corporations that offer shares for sale to the public are usually required by law to report revenue based on generally accepted accounting principles or International Financial Reporting Standards.

In a double-entry bookkeeping system, revenue accounts are general ledger accounts that are summarized periodically under the heading Revenue or Revenues on an income statement. Revenue account names describe the type of revenue, such as "Repair service revenue", "Rent revenue earned" or "Sales".

Money income from activities that are ordinary for a particular corporation, company, partnership, or sole-proprietorship. For some businesses, such as manufacturing or grocery, most revenue is from the sale of goods. Service

businesses such as law firms and barber shops receive most of their revenue from rendering services. Lending businesses such as car rentals and banks receive most of their revenue from fees and interest generated by lending assets to other organizations or individuals.

Revenues from a business's primary activities are reported as **sales, sales revenue** or **net sales**. This includes product returns and discounts for early payment of invoices. Most businesses also have revenue that is incidental to the business's primary activities, such as interest earned on deposits in a demand account. This is included in revenue but not included in net sales. Sales revenue does not include sales tax collected by the business.

Other revenue (a.k.a. non-operating revenue) is revenue from peripheral (non-core) operations. For example, a company that manufactures and sells automobiles would record the revenue from the sale of an automobile as "regular" revenue. If that same company also rented a portion of one of its buildings, it would record that revenue as "other revenue" and disclose it separately on its income statement to show that it is from something other than its core operations. The combination of all the revenue generating systems of a business is called its revenue model.

Revenue is a crucial part of financial statement analysis. The company's performance is measured to the extent to which its asset inflows (revenues) compare with its asset outflows (expenses). Net income is the result of this equation, but revenue typically enjoys equal attention during a standard earnings call. If a company displays solid "top-line growth", analysts could view the period's performance as positive even if earnings growth, or "bottom-line growth" is stagnant. Conversely, high net income growth would be tainted if a company failed to produce significant revenue growth. Consistent revenue growth, if accompanied by net income growth, contributes to the value of an enterprise and therefore the stock price.

Revenue is used as an indication of earnings quality. There are several financial ratios attached to it, the most important being gross margin and profit margin. Also, companies use revenue to determine bad debt expense using the income statement method.

Price / Sales is sometimes used as a substitute for a Price to earnings ratio when earnings are negative and the P/E is meaningless. Though a company may have negative earnings, it almost always has positive revenue.

Gross Margin is a calculation of revenue less cost of goods sold, and is used to determine how well sales cover direct variable costs relating to the production of goods.

Net income/sales, or profit margin, is calculated by investors to determine how efficiently a company turns revenues into profits.

Government revenue includes all amounts of money (i.e., taxes and fees) received from sources outside the government entity. Large governments usually have an agency or department responsible for collecting government revenue from companies and individuals.

Government revenue may also include reserve bank currency which is printed. This is recorded as an advance to the retail bank together with a corresponding currency in circulation expense entry, that is, the income derived from the Official Cash rate payable by the retail banks for instruments such as 90-day bills. There is a question as to whether using generic business-based accounting standards can give a fair and accurate picture of government accounts, in that with a monetary policy statement to the reserve bank directing a positive inflation rate, the expense provision for the return of currency to the reserve bank is largely symbolic, such that to totally cancel the currency in circulation provision, all currency would have to be returned to the reserve bank and cancelled.

Service

In economics, a **service** is a transaction in which no physical goods are transferred from the seller to the buyer. The benefits of such a service are held to be demonstrated by the buyer's willingness to make the exchange. Public services are those that society (nation state, fiscal union, region) as a whole pays for. Using resources, skill, ingenuity, and experience, service providers benefit service consumers.

Services are by definition intangible. They are not manufactured, transported or stocked. It is used in marketing to describe the inability to assess the value gained from an activity using any tangible e

Services cannot be stored for a future use. They are produced and consumed simultaneously.

Services are perishable in two regards:

- Service-relevant resources, processes and systems are assigned for service delivery during a specific period in time. If the service consumer does not request and consume the service during this period, the related resources may go unused. From the perspective of the service provider, this is a lost business opportunity if no other use for those resources is available. Examples: A hairdresser serves another client. An empty seat on an airplane cannot be filled after departure.
- When the service has been completely rendered to the consumer, this particular service irreversibly vanishes. Example: a passenger has been transported to the destination and the flight is

The service provider must deliver the service at the time of service consumption. The service is not manifested in a physical object that is independent of the provider. The service consumer is also inseparable from service delivery. Examples: The service consumer must sit in the hairdresser's chair, or in the airplane seat. Correspondingly, the hairdresser or the pilot must be in the shop or plane, respectively, to deliver the service.

Each service is unique. It can never be exactly repeated as the time, location, circumstances, conditions, current configurations and/or as signed resources are different for the next delivery, even if the same service consumer requests the same

service. Many services are regarded as heterogeneous and are typically modified for each service consumer or each service contextual . Example: The taxi service which transports the service consumer from home to work is different from the taxi service which transports the same service consumer from work to home – another point in time, the other direction, possibly another route, probably another taxi driver and cab. Another and more common term for this is heterogeneity.

Both service provider and service consumer participate in the service providers.

Mass generation and delivery of services must be mastered for a service provider to expand. This can be seen as a problem of service quality. Both inputs and outputs to the processes involved providing services are highly variable, as are the relationships between these processes, making it difficult to maintain consistent service quality. Many services involve variable human activity, rather than a precisely determined process; exceptions include utilities. The human factor is often the key success factor in service provision. Demand can vary by season, time of day, business cycle, etc. Consistency is necessary to create enduring business relationships.

Any service can be clearly and completely, consistently and concisely specified by means of standard attributes that conform to the MECE principle (Mutually Exclusive, Collectively Exhaustive).

- Service consumer benefits – (set of) benefits that are triggerable, consumable and effectively utilizable for any authorized service consumer and that are rendered upon request. These benefits must be described in terms that are meaningful to consumers.
- Service-specific functional parameters – parameters that are essential to the respective service and that describe the important dimension(s) of the servicescape, the service output or the service outcome, e.g. whether the passenger sits in an aisle or window seat.
- Service delivery point – the physical location and/or logical interface where the benefits of the service are rendered to the consumer. At this point the service delivery preparation can be assessed and delivery can be monitored and controlled.
- Service consumer count – the number of consumers that are enabled to consume a service.
- Service delivery readiness time – the moments when the service is available and all the specified service elements are available at the delivery point

- Service consumer support times – the moments when the support team ("service desk") is available. The service desk is the Single Point of Contact (SPoC) for service inquiries. At those times, the service desk can be reached via commonly available communication methods (phone, web, etc.)
- Service consumer support language – the language(s) spoken by the service desk.
- Service fulfillment target – the provider's promise to deliver the service, expressed as the ratio of the count of successful service deliveries to the count of service requests by a single consumer or consumer group over some time period.
- Service impairment duration – the maximum allowable interval between the first occurrence of a service impairment and the full resumption and completion of the service delivery.
- Service delivery duration – the maximum allowable period for effectively rendering all service benefits to the consumer.
- Service delivery unit – the scope/number of action(s) that constitute a delivered service. Serves as the reference object for the Service Delivering Price, for all service costs as well as for charging and billing.
- Service delivery price – the amount of money the customer pays to receive a service. Typically, the price includes a service access price that qualifies the consumer to request the service and a service consumption price for each delivered service.

The delivery of a service typically involves six factors:

- Service provider (workers and managers)
- Equipment used to provide the service (e.g. vehicles, cash registers, technical systems, computer systems)
- Physical facilities (e.g. buildings, parking, waiting rooms)
- Service consumer
- Other customers at the service delivery location
- Customer contact

The service encounter is defined as all activities involved in the service delivery process. Some service managers use the term "moment of truth" to indicate that point in a service encounter where interactions are most intense.

Many business theorists view service provision as a performance or act (sometimes humorously referred to as *dramalurgy*, perhaps in reference to dramaturgy). The location of the service delivery is referred to as the stage and the objects that facilitate

the service process are called props. A script is a sequence of behaviors followed by those involved, including the client(s). Some service dramas are tightly scripted, others are more ad lib. Role congruence occurs when each actor follows a script that harmonizes with the roles played by the other actors.

In some service industries, especially health care, dispute resolution and social services, a popular concept is the idea of the caseload, which refers to the total number of patients, clients, litigants, or claimants for which a given employee is responsible. Employees must balance the needs of each individual case against the needs of all other current cases as well as their own needs.

Under English law, if a service provider is induced to deliver services to a dishonest client by a deception, this is an offence under the Theft Act 1978.

Lovelock used the number of delivery sites (whether single or multiple) and the method of delivery to classify services in a 2 x 3 matrix. Then implications are that the convenience of receiving the service is the lowest when the customer has to come to the service and must use a single or specific outlet. Convenience increases (to a point) as the number of service points increase.

The distinction between a good and a service remains disputed. The perspective in the late-eighteenth and early-nineteenth centuries focused on creation and possession of wealth. Classical economists contended that goods were objects of value over which ownership rights could be established and exchanged. Ownership implied tangible possession of an object that had been acquired through purchase, barter or gift from the producer or previous owner and was legally identifiable as the property of the current owner.

Adam Smith's famous book, *The Wealth of Nations*, published in 1776, distinguished between the outputs of what he termed "productive" and "unproductive" labor. The former, he stated, produced goods that could be stored after production and subsequently exchanged for money or other items of value. The latter, however useful or necessary, created services that perished at the time of production and therefore did not contribute to wealth. Building on this theme, French economist Jean-Baptiste Say argued that production and consumption were inseparable in services, coining the term "immaterial products" to describe them.

Most modern business theorists describe a continuum with pure service on one terminal point and pure commodity good on the other. Most products fall between these two extremes. For example, a restaurant provides a physical good (the food), but also provides services in the form of ambience, the setting and clearing of the table,

etc. And although some utilities actually deliver physical goods — like water utilities that deliver water — utilities are usually treated as services.

In a narrower sense, service refers to quality of customer service: the measured appropriateness of assistance and support provided to a customer. This particular usage occurs frequently in retailing.

Real income

Real income is income of individuals or nations after adjusting for inflation. It is calculated by dividing nominal income by the price level. Real variables such as real income and real GDP are variables that are measured in physical units, while nominal variables such as nominal income and nominal GDP are measured in monetary units. Therefore, real income is a more useful indicator of well-being since it measures the amount of goods and services that can be purchased with the income.

According to the classical dichotomy theory, real variables and nominal variables are separate in the long run, so they are not influenced by each other. In other words, if the nominal starting income was 100 and there was 10% inflation (general rise in prices, for example, what cost 10 now costs 11), then with nominal income of still 100, one can buy roughly 9% less; so if nominal income was not adjusted for inflation (did not rise by 10%), real income has dropped by approximately 9%. But if the classical dichotomy holds, nominal income will eventually go up by 10%, leaving real income unchanged from its original value.

Auction

An auction is a process of buying and selling goods or services by offering them up for bid, taking bids, and then selling the item to the highest bidder. The open ascending price auction is arguably the most common form of auction in use today. Participants bid openly against one another, with each subsequent bid required to be higher than the previous bid. An auctioneer may announce prices, bidders may call out their bids themselves (or have a proxy call out a bid on their behalf), or bids may be submitted electronically with the highest current bid publicly displayed. In a Dutch auction, the auctioneer begins with a high asking price for some quantity of like items; the price is lowered until a participant is willing to accept the auctioneer's price for some quantity of the goods in the lot or until the seller's reserve price is met. While auctions are most associated in the public imagination with the sale of antiques, paintings, rare collectibles and expensive wines, auctions are also used for commodities, livestock, radio spectrum and used cars. In economic theory, an auction may refer to any mechanism or set of trading rules for exchange.

The word "auction" is derived from the Latin *augeō*, which means "I increase" or "I augment". For most of history, auctions have been a relatively uncommon way to negotiate the exchange of goods and commodities. In practice, both haggling and sale by set-price have been significantly more common. Indeed, before the seventeenth century the few auctions that were held were sporadic.

Nonetheless, auctions have a long history, having been recorded as early as 500 B.C. According to Herodotus, in Babylon auctions of women for marriage were held annually. The auctions began with the woman the auctioneer considered to be the most beautiful and progressed to the least. It was considered illegal to allow a daughter to be sold outside of the auction method.

During the Roman Empire, following military victory, Roman soldiers would often drive a spear into the ground around which the spoils of war were left, to be auctioned off. Later slaves, often captured as the "spoils of war", were auctioned in the forum under the sign of the spear, with the proceeds of sale going towards the war effort.

The Romans also used auctions to liquidate the assets of debtors whose property had been confiscated. For example, Marcus Aurelius sold household furniture to pay off debts, the sales lasting for months. One of the most significant historical auctions occurred in the year 193 A.D. when the entire Roman Empire was put on the auction

block by the Praetorian Guard. On 28 March 193, the Praetorian Guard first killed emperor Pertinax, then offered the empire to the highest bidder. Didius Julianus outbid everyone else for the price of 6,250 drachmas per guard, an act that initiated a brief civil war. Didius was then beheaded two months later when Septimius Severus conquered Rome.

From the end of the Roman Empire to the eighteenth century auctions lost favor in Europe, while they had never been widespread in Asia.

In some parts of England during the seventeenth and eighteenth centuries auction by candle began to be used for the sale of goods and leaseholds. In a candle auction, the end of the auction was signaled by the expiration of a candle flame, which was intended to ensure that no one could know exactly when the auction would end and make a last-second bid. Sometimes, other unpredictable processes, such as a footrace, were used in place of the expiration of a candle. This type of auction was first mentioned in 1641 in the records of the House of Lords. The practice rapidly became popular, and in 1660 Samuel Pepys's diary recorded two occasions when the Admiralty sold surplus ships "by an inch of candle". Pepys also relates a hint from a highly successful bidder, who had observed that, just before expiring, a candle-wick always flares up slightly: on seeing this, he would shout his final - and winning - bid. The London Gazette began reporting on the auctioning of artwork at the coffeehouses and taverns of London in the late 17th century.

The first known auction house in the world was Stockholm Auction House, Sweden (*Stockholms Auktionsverk*), founded by Baron Claes Rålamb in 1674. Sotheby's, currently the world's second-largest auction house, was founded in London on 11 March 1744, when Samuel Baker presided over the disposal of "several hundred scarce and valuable" books from the library of an acquaintance. Christie's, now the world's largest auction house, was founded by James Christie in 1766 in London and published its first auction catalog in 1766, although newspaper advertisements of Christie's sales dating from 1759 have been found.

Other early auction houses that are still in operation include Dorotheum (1707), Mallams (1788), Bonhams (1793), Phillips de Pury & Company (1796), Freeman's (1805) and Lyon & Turnbull (1826).

By the end of the 18th century, auctions of art works were commonly held in taverns and coffeehouses. These auctions were held daily, and auction catalogs were printed to announce available items. In some cases these catalogs were elaborate works of art themselves, containing considerable detail about the items

being auctioned. At this time, Christie's established a reputation as a leading auction house, taking advantage of London's status as the major centre of the international art trade after the French Revolution.

During the American civil war goods seized by armies were sold at auction by the Colonel of the division. Thus, some of today's auctioneers in the U.S. carry the unofficial title of "colonel".

The development of the internet, however, has led to a significant rise in the use of auctions as auctioneers can solicit bids via the internet from a wide range of buyers in a much wider range of commodities than was previously practical.

In 2008, the National Auctioneers Association reported that the gross revenue of the auction industry for that year was approximately \$268.4 billion, with the fastest growing sectors being agricultural, machinery, and equipment auctions and residential real estate auctions.

There are traditionally four types of auction that are used for the allocation of a single item:

- English auction, also known as an *open ascending price auction*. This type of auction is arguably the most common form of auction in use today. Participants bid openly against one another, with each subsequent bid required to be higher than the previous bid. An auctioneer may announce prices, bidders may call out their bids themselves (or have a proxy call out a bid on their behalf), or bids may be submitted electronically with the highest current bid publicly displayed. In some cases a maximum bid might be left with the auctioneer, who may bid on behalf of the bidder according to the bidder's instructions. The auction ends when no participant is willing to bid further, at which point the highest bidder pays their bid. Alternatively, if the seller has set a minimum sale price in advance (the 'reserve' price) and the final bid does not reach that price the item remains unsold. Sometimes the auctioneer sets a minimum amount by which the next bid must exceed the current highest bid. The most significant distinguishing factor of this auction type is that the current highest bid is always available to potential bidders. The English auction is commonly used for selling goods, most prominently antiques and artwork, but also secondhand goods and real estate.
- Dutch auction also known as an *open descending price auction*. In the traditional Dutch auction the auctioneer begins with a high asking price for some quantity of like items; the price is lowered until a participant is willing to accept the auctioneer's price for some quantity of the goods in the lot or until the seller's reserve price is met. If the first bidder does not purchase the entire

lot, the auctioneer continues lowering the price until all of the items have been bid for or the reserve price is reached. Items are allocated based on bid order; the highest bidder selects their item(s) first followed by the second highest bidder, etc. In a modification, all of the winning participants pay only the last announced price for the items that they bid on. The Dutch auction is named for its best known example, the Dutch tulip auctions. ("Dutch auction" is also sometimes used to describe online auctions where several identical goods are sold simultaneously to an equal number of high bidders.) In addition to cut flower sales in the Netherlands, Dutch auctions have also been used for perishable commodities such as fish and tobacco. The Dutch auction is not widely used, except in market orders in stock or currency exchanges, which are functionally identical.

- Sealed first-price auction or blind auction, also known as a first-price sealed-bid auction (FPSB). In this type of auction all bidders simultaneously submit sealed bids so that no bidder knows the bid of any other participant. The highest bidder pays the price they submitted. This type of auction is distinct from the English auction, in that bidders can only submit one bid each. Furthermore, as bidders cannot see the bids of other participants they cannot adjust their own bids accordingly. From the theoretical perspective, this kind of bid process has been argued to be strategically equivalent to the Dutch auction. However, empirical evidence from laboratory experiments has shown that Dutch auctions with high clock speeds yield lower prices than FPSB auctions. What are effectively sealed first-price auctions are commonly called *tendering* for procurement by companies and organisations, particularly for government contracts and auctions for mining leases.
- Vickrey auction, also known as a *sealed-bid second-price auction*. This is identical to the sealed first-price auction except that the winning bidder pays the second-highest bid rather than his or her own. Vickrey auctions are extremely important in auction theory, and commonly used in automated contexts such as real-time bidding for online advertising, but rarely in non-automated contexts.

Most auction theory revolves around these four "standard" auction types. However, many other types of auctions exist, generally sharing many, including:

- Multiunit auctions sell more than one identical item at the same time, rather than having separate auctions for each. This type can be further classified as either a uniform price auction or a discriminatory price auction.
- All-pay auction is an auction in which all bidders must pay their bids regardless of whether they win. The highest bidder wins the item. All-pay auctions are

primarily of academic interest, and may be used to model lobbying or bribery (bids are political contributions) or competitions such as a running race .

- Auction by the candle. A type of auction, used in England for selling ships, in which the highest bid laid on the table by the time a burning candle goes out wins.
- Bidding fee auction, also known as a penny auction, often requires that each participant must pay a fixed price to place each bid, typically one penny (hence the name) higher than the current bid. When an auction's time expires, the highest bidder wins the item and must pay a final bid price. Unlike in a conventional auction, the final price is typically much lower than the value of the item, but all bidders (not just the winner) will have paid for each bid placed; the winner will buy the item at a very low price (plus price of rights-to-bid used), all the losers will have paid, and the seller will typically receive significantly more than the value of the item.
- Buyout auction is an auction with an additional set price (the 'buyout' price) that any bidder can accept at any time during the auction, thereby immediately ending the auction and winning the item. If no bidder chooses to utilize the buyout option before the end of bidding the highest bidder wins and pays their bid. Buyout options can be either *temporary* or *permanent*. In a temporary-buyout auction the option to buy out the auction is not available after the first bid is placed. In a permanent-buyout auction the buyout option remains available throughout the entire auction until the close of bidding. The buyout price can either remain the same throughout the entire auction, or vary throughout according to rules or simply as decided by the seller.
- Combinatorial auction is any auction for the simultaneous sale of more than one item where bidders can place bids on an "all-or-nothing" basis on "packages" rather than just individual items. That is, a bidder can specify that he or she will pay for items A and B, but only if he or she gets *both*. In combinatorial auctions, determining the winning bidder(s) can be a complex process where even the bidder with the highest individual bid is not guaranteed to win. For example, in an auction with four items (W, X, Y and Z), if Bidder A offers \$50 for items W & Y, Bidder B offers \$30 for items W & X, Bidder C offers \$5 for items X & Z and Bidder D offers \$30 for items Y & Z, the winners will be Bidders B & D while Bidder A misses out because the *combined* bids of Bidders B & D is higher (\$60) than for Bidders A and C (\$55).
- Generalized second-price auction and Generalized first-price auction
- Unique bid auctions
- Many homogenous item auctions, e.g., spectrum auctions

- Japanese auction is a variation of the English auction. When the bidding starts no new bidders can join, and each bidder must continue to bid each round or drop out. It has similarities to the ante in Poker.
- Lloyd's syndicate auction.
- Mystery auction is a type of auction where bidders bid for boxes or envelopes containing unspecified or underspecified items, usually on the hope that the items will be humorous, interesting, or valuable. In the early days of eBay's popularity, sellers began promoting boxes or packages of random and usually low-value items not worth selling by themselves.
- No-reserve auction (NR), also known as an *absolute auction*, is an auction in which the item for sale will be sold regardless of price. From the seller's perspective, advertising an auction as having no reserve price can be desirable because it potentially attracts a greater number of bidders due to the possibility of a bargain. If more bidders attend the auction, a higher price might ultimately be achieved because of heightened competition from bidders. This contrasts with a *reserve auction*, where the item for sale may not be sold if the final bid is not high enough to satisfy the seller. In practice, an auction advertised as "absolute" or "no-reserve" may nonetheless still not sell to the highest bidder on the day, for example, if the seller withdraws the item from the auction or extends the auction period indefinitely, although these practices may be restricted by law in some jurisdictions or under the terms of sale available from the auctioneer.
- Reserve auction is an auction where the item for sale may not be sold if the final bid is not high enough to satisfy the seller; that is, the seller *reserves* the right to accept or reject the highest bid. In these cases a set 'reserve' price known to the auctioneer, but not necessarily to the bidders, may have been set, below which the item may not be sold. If the seller announces to the bidders the reserve price, it is a public reserve price auction. In contrast, if the seller does not announce the reserve price before the sale but only after the sale, it is a secret reserve price auction. The reserve price may be *fixed* or *discretionary*. In the latter case, the decision to accept a bid is deferred to the auctioneer, who may accept a bid that is marginally below it. A reserve auction is safer for the seller than a no-reserve auction as they are not required to accept a low bid, but this could result in a lower final price if less interest is generated in the sale.
- Reverse auction is a type of auction in which the roles of the buyer and the seller are reversed, with the primary objective to drive purchase prices downward. While ordinary auctions provide suppliers the opportunity to find the best price among interested buyers, reverse auctions give buyers a chance to find the lowest-price supplier. During a reverse auction, suppliers may submit multiple offers, usually as a response to competing suppliers' offers, bidding down the price of a good or service to the lowest price they are willing to

receive. By revealing the competing bids in real time to every participating supplier, reverse auctions promote “information transparency”. This, coupled with the dynamic bidding process, improves the chances of reaching the fair market value of the item.

- Senior auction is a variation on the all-pay auction, and has a defined loser in addition to the winner. The top two bidders must pay their full final bid amounts, and only the highest wins the auction. The intent is to make the high bidders bid above their upper limits. In the final rounds of bidding, when the current losing party has hit their maximum bid, they are encouraged to bid over their maximum (seen as a small loss) to avoid losing their maximum bid with no return (a very large loss).
- Silent auction is a variant of the English auction in which bids are written on a sheet of paper. At the predetermined end of the auction, the highest listed bidder wins the item. This auction is often used in charity events, with many items auctioned simultaneously and "closed" at a common finish time. The auction is "silent" in that there is no auctioneer selling individual items, the bidders writing their bids on a bidding sheet often left on a table near the item. At charity auctions, bid sheets usually have a fixed starting amount, predetermined bid increments, and a "guaranteed bid" amount which works the same as a "buy now" amount. Other variations of this type of auction may include sealed bids. The highest bidder pays the price he or she submitted.
- Top-up auction is a variation on the all-pay auction, primarily used for charity events. Losing bidders must pay the difference between their bid and the next lowest bid. The winning bidder pays the amount bid for the item, without top-up.
- Walrasian auction or *Walrasian tâtonnement* is an auction in which the auctioneer takes bids from both buyers and sellers in a market of multiple goods. The auctioneer progressively either raises or drops the current proposed price depending on the bids of both buyers and sellers, the auction concluding when supply and demand exactly balance. As a high price tends to dampen demand while a low price tends to increase demand, in theory there is a particular price somewhere in the middle where supply and demand will match.
- Amsterdam auctions, a type of premium auction which begins as an English auction. Once only two bidders remain, each submits a sealed bid. The higher bidder wins, paying either the first or second price. Both finalists receive a premium: a proportion of the excess of the second price over the third price (at which English auction ended).
- Other auctions: Other auction types also exist, such as Simultaneous Ascending Auction Anglo-Dutch auction, Private value auction, Common value auction

The range of auctions that take place is extremely wide and one can buy almost anything, from a house to an endowment policy and everything in-between. Some of the recent developments have been the use of the Internet both as a means of disseminating information about various auctions and as a vehicle for hosting auctions themselves .

- **Government, bankruptcy and general auctions** are amongst the most common auctions to be found today. A government auction is simply an auction held on behalf of a government body generally at a general sale. Here one may find a vast range of materials that have to be sold by various government bodies, for example: HM Customs & Excise, the Official Receiver, the Ministry of Defence, local councils and authorities, liquidators, as well as material put up for auction by companies and members of the public. Also in this group you will find auctions ordered by executors who are entering the assets of individuals who have perhaps died in testate (those who have died without leaving a will), or in debt. One of the most interesting bodies to look out for at auction is HM Customs & Excise who may be entering at auction various items seized from smugglers, fraudsters and racketeers.
- **Motor vehicle and car auctions** – Here one can buy anything from an accident-damaged car to a brand new top-of-the-range model; from a run-of-the-mill family saloon to a rare collector's item.
- **Police auctions** are generally held at general auctions although some forces use online sites including eBay to dispose of lost and found and seized goods.
- **Land and property auctions** – Here one can buy anything from an ancient castle to a brand new commercial premises.
- **Antiques and collectibles auctions** hold the opportunity for viewing a huge array of items.
- **Internet auctions** – With a potential audience of millions the Internet is the most exciting part of the auction world at the moment. Led by sites in the United States but closely followed by UK auction houses, specialist Internet auctions are springing up all over the place, selling everything from antiques and collectibles to holidays, air travel, brand new computers, and household equipment.
- **Titles** – One can buy a manorial title at auction. Every year several of these specialist auctions take place. However, it is important to note that manorial titles are not the same thing as peerages, and have been described as "meaningless" in the modern world.

- **Insurance policies** – Auctions are held for second-hand endowment policies. The attraction is that someone else has already paid substantially to set up the policy in the first place, and one will be able (with the help of a financial calculator) to calculate its real worth and decide whether it is worth taking on.
- **On-site auctions** – Sometimes when the stock or assets of a company are simply too vast or too bulky for an auction house to transport to their own premises and store, they will hold an auction within the confines of the bankrupt company itself. Bidders could find themselves bidding for items which are still plugged in, and the great advantage of these auctions taking place on the premises is that they have the opportunity to view the goods as they were being used, and may be able to try them out. Bidders can also avoid the possibility of goods being damaged whilst they are being removed as they can do it or at least supervise the activity.
- **Private treaty sales** – Occasionally, when looking at an auction catalogue some of the items have been withdrawn. Usually these goods have been sold by 'private treaty'. This means that the goods have already been sold off, usually to a trader or dealer on a private, behind-the-scenes basis before they have had a chance to be offered at the auction sale. These goods are rarely in single lots – photocopiers or fax machines would generally be sold in bulk lots.
- **Charity auctions** - Used by nonprofits, higher education, and religious institutions as a method to raise funds for a specific mission or cause both through the act of bidding itself, and by encouraging participants to support the cause and make personal donations. Often, these auctions are linked with another charity event like a benefit concert.

Each type of auction has its specific qualities such as pricing accuracy and time required for preparing and conducting the auction. The number of simultaneous bidders is of critical importance. Open bidding during an extended period of time with many bidders will result in a final bid that is very close to the true market value. Where there are few bidders and each bidder is allowed only one bid, time is saved, but the winning bid may not reflect the true market value with any degree of accuracy. Of special interest and importance during the actual auction is the time elapsed from the moment that the first bid is revealed to the moment that the final (winning) bid has become a binding agreement.

Auctions are publicly and privately seen in several contexts and almost anything can be sold at auction. Some typical auction arenas include the following:

- The antique business, where besides being an opportunity for trade they also serve as social occasions and entertainment
- In the sale of collectibles such as stamps, coins, vintage toys & trains, classic cars, fine art and luxury real estate
- The wine auction business, where serious collectors can gain access to rare bottles and mature vintages, not typically available through retail channels
- In the sale of all types of real property including residential and commercial real estate, farms, vacant lots and land; this is the method used on tax sales.
- For the sale of consumer second-hand goods of all kinds, particularly farm (equipment) and house clearances and online auctions.
- Sale of industrial machinery, both surplus or through insolvency.
- In commodities auctions, like the fish wholesale auctions
- In livestock auctions where sheep, cattle, pigs and other livestock are sold. Sometimes very large numbers of stock are auctioned, such as the regular sales of 50,000 or more sheep during a day in New South Wales.
- In wool auctions where international agents purchase lots of wool
- Thoroughbred horses, where yearling horses and other bloodstock are auctioned.
- In legal contexts where forced auctions occur, as when one's farm or house is sold at auction on the courthouse steps. (Property seized for non-payment of property taxes, or under foreclosure, is sold in this manner.)
- Travel tickets. One example is SJ AB in Sweden auctioning surplus at Tradera (Swedish eBay).
- Holidays. A variety of holidays are available for sale online particularly via eBay. Vacation rentals appear to be most common. Many holiday auction websites have launched but failed.
- Self storage units. In certain jurisdictions, if a storage facility's tenant fails to pay his/her rent, the contents of his/her locker(s) may be sold at a public auction. Several television shows focus on such auctions, including *Storage Wars* and *Auction Hunters*.

Although less publicly visible, the most economically important auctions are the commodities auctions in which the bidders are businesses even up to corporation level. Examples of this type of auction include:

- Sales of businesses
- Spectrum auctions, in which companies purchase licenses to use portions of the electromagnetic spectrum for communications (e.g., mobile phone networks)

- Private electronic markets using combinatorial auction techniques to continuously sell commodities (coal, iron ore, grain, water...) to a pre-qualified group of buyers (based on price and non-price factors)
- Timber auctions, in which companies purchase licenses to log on government land
- Timber allocation auctions, in which companies purchase timber directly from the government Forest Auctions
- Electricity auctions, in which large-scale generators and consumers of electricity bid on generating contracts
- Environmental auctions, in which companies bid for licenses to avoid being required to decrease their environmental impact. These include auctions in emissions trading schemes.
- Debt auctions, in which governments sell debt instruments, such as bonds, to investors. The auction is usually sealed and the uniform price paid by the investors is typically the best non-winning bid. In most cases, investors can also place so called *non-competitive bids*, which indicates an interest to purchase the debt instrument at the resulting price, whatever it may be
- Auto auctions, in which car dealers purchase used vehicles to retail to the public.
- Produce auctions, in which produce growers have a link to localized wholesale buyers (buyers who are interested in acquiring large quantities of locally grown produce).

Katehakis and Puranam provided the first model for the problem of optimal bidding for a firm that in each period procures items to meet a random demand by participating in a finite sequence of auctions. In this model an item valuation derives from the sale of the acquired items via their demand distribution, sale price, acquisition cost, salvage value and lost sales. They established monotonicity properties for the value function and the optimal dynamic bid policy. They also provided a model for the case in which the buyer must acquire a fixed number of items either at a fixed buy-it-now price in the open market or by participating in a sequence of auctions. The objective of the buyer is to minimize his expected total cost for acquiring the fixed number of items.

Bid shading is placing a bid which is below the bidder's actual value for the item. Such a strategy risks losing the auction, but has the possibility of winning at a low price. Bid shading can also be a strategy to avoid the Winner's curse.

Chandelier or rafter bidding

This is the practice, especially by high-end art auctioneers, of raising false bids at crucial times in the bidding in order to create the appearance of greater demand or to extend bidding momentum for a work on offer. To call out these nonexistent bids auctioneers might fix their gaze at a point in the auction room that is difficult for the audience to pin down. The practice is frowned upon in the industry. In the United States, chandelier bidding is not illegal. In fact, an auctioneer may bid up the price of an item to the reserve price, which is an unstated amount the consignor will not sell the item for. However, the auction house is required to disclose this information.

In the United Kingdom this practice is legal on property auctions up to but not including the reserve price, and is also known as off-the-wall bidding.

Whenever bidders at an auction are aware of the identity of the other bidders there is a risk that they will form a "ring" or "pool" and thus manipulate the auction result, a practice known as collusion. By agreeing to bid only against outsiders, never against members of the "ring", competition becomes weaker, which may dramatically affect the final price level. After the end of the official auction an unofficial auction may take place among the "ring" members. The difference in price between the two auctions could then be split among the members. This form of a ring was used as a central plot device in the opening episode of the 1979 British television series *The House of Caradus*, 'For Love or Money', uncovered by Helena Caradus on her return from Paris.

A ring can also be used to increase the price of an auction lot, in which the owner of the object being auctioned may increase competition by taking part in the bidding him or herself, but drop out of the bidding just before the final bid. In Britain and many other countries, rings and other forms of bidding on one's own object are illegal. This form of a ring was used as a central plot device in an episode of the British television series *Lovejoy* (series 4, episode 3), in which the price of a watercolour by the (fictional) Jessie Webb is inflated so that others by the same artist could be sold for more than their purchase price.

In an English auction, a dummy bid is a bid made by a dummy bidder acting in collusion with the auctioneer or vendor, designed to deceive genuine bidders into paying more. In a first-price auction, a dummy bid is an unfavourable bid designed so as not to become the winning bid. (The bidder does not want to win this auction, but he or she wants to make sure to be invited to the next auction).

In Australia, a dummy bid (shill, schill) is a criminal offence, but a vendor bid or a co-owner bid below the reserve price is permitted, if clearly declared as such by the auctioneer. These are all official legal terms in Australia, but may have other meanings elsewhere. A co-owner is one of two or several owners (who disagree among themselves).

In Sweden and many other countries there are no legal restrictions, but it will severely hurt the reputation of an auction house that knowingly permits any other bids except genuine bids. If the reserve is not reached this should be clearly declared.

In South Africa auctioneers can use their staff or any bidder to raise the price as long as its disclosed before the auction sale. The Auction Alliance controversy focused on vendor bidding and it was proven to be legal and acceptable in terms of the South African consumer laws.

Suggested opening bid (SOB)

There will usually be an estimate of what price the lot will fetch. In an ascending open auction it is considered important to get at least a 50-percent increase in the bids from start to finish. To accomplish this, the auctioneer must start the auction by announcing a suggested opening bid (SOB) that is low enough to be immediately accepted by one of the bidders. Once there is an opening bid, there will quickly be several other, higher bids submitted. Experienced auctioneers will often select an SOB that is about 45 percent of the (lowest) estimate. Thus there is a certain margin of safety to ensure that there will indeed be a lively auction with many bids submitted. Several observations indicate that the lower the SOB, the higher the final winning bid. This is due to the increase in the number of bidders attracted by the low SOB.

A chi-squared distribution shows many low bids but few high bids. Bids "show up together"; without several low bids there will not be any high bids.

Another approach to choosing an SOB: The auctioneer may achieve good success by asking the expected final sales price for the item, as this method suggests to the potential buyers the item's particular value. For instance, say an auctioneer is about to sell a \$1,000 car at a sale. Instead of asking \$100, hoping to entice wide interest (for who wouldn't want a \$1,000 car for \$100?), the auctioneer may suggest an opening bid of \$1,000; although the first bidder may begin bidding at a mere \$100, the final bid may more likely approach \$1,000.

Terminology

- Appraisal – an estimate of an item's worth, usually performed by an expert in that particular field.
- Auction block - a raised platform on which the auctioneer shows the items to be auctioned; can also be slang for the auction itself.
- Auction chant - a rhythmic repetition of numbers and "filler words" spoken by an auctioneer in the process of conducting an auction.
- Auction fever - an emotional state elicited in the course of one or more auctions that causes a bidder to deviate from an initially chosen bidding strategy.
- Auction house - the company operating the auction (i.e., establishing the date and time of the auction, the auction rules, determining which item(s) are to be included in the auction, registering bidders, taking payments, and delivering the goods to the winning bidders).
- Auctioneer - the person conducting the actual auction. They announce the rules of the auction and the item(s) being auctioned, call and acknowledging bids made, and announce the winner. They generally will call the auction using auction chant.
 - The auctioneer may operate his/her own auction house (and thus perform the duties of both auctioneer and auction house), and/or work for another house.
 - Auctioneers are frequently regulated by governmental entities, and in those jurisdictions must meet certain criteria to be licensed (be of a certain age, have no disqualifying criminal record, attend auction school, pass an examination, and pay a licensing fee).
 - Auctioneers may or may not (depending on the laws of the jurisdiction and/or the policies of the auction house) bid for their own account, or if they do must disclose this to bidders at the auction; similar rules may apply for employees of the auctioneer or the auction house.
- Bidding - the act of participating in an auction by offering to purchase an item for sale.
- Buyer's premium – a fee paid by the buyer to the auction house; it is typically calculated as a percentage of the winning bid and added on it. Depending on the jurisdiction the buyer's premium, in addition to the sales price, may be subject to VAT or sales tax.
- Buyout price – A price that, if accepted by a bidder, immediately ends the auction and awards the item to him/her (an example is eBay's BuyItNow feature).
- Choice - a form of bidding whereby a number of identical or similar items are bid at a single price for each item

- Clearance rate – The percentage of items that sell over the course of the auction.
- Commission – a fee paid by a consignor/seller to the auction house; it is typically calculated as a percentage of the winning bid and deducted from the gross proceeds due to the consignor/seller.
- Consignee and consignor - as pertaining to auctions, the consignor (also called the seller, and in some contexts the vendor) is the person owning the item to be auctioned or the owner's representative, while the consignee is the auction house. The consignor maintains title until such time that an item is purchased by a bidder and the bidder pays the auction house.
- Dummy bid (a/k/a "ghost bid") - a false bid, made by someone in collusion with the seller or auctioneer, designed to create a sense of increased interest in the item (and, thus, increased bids).
- Dynamic closing - a mechanism used to prevent auction sniping, by which the closing time is extended for a small period to allow other bidders to increase their bids.
- eBidding – electronic bidding, whereby a person may make a bid without being physically present at an auction (or where the entire auction is taking place on the Internet).
- Earnest money deposit (a/k/a "caution money deposit" or "registration deposit") – a payment that must be made by prospective bidders ahead of time in order to participate in an auction.
 - The purpose of this deposit is to deter non-serious bidders from attending the auction; by requiring the deposit, only bidders with a genuine interest in the item(s) being sold will participate.
 - This type of deposit is most often used in auctions involving high-value goods (such as real estate).
 - The winning bidder has his/her earnest money applied toward the final selling price; the non-winners have theirs refunded to them.
- Escrow – an arrangement in which the winning bidder pays the amount of his/her bid to a third party, who in turn releases the funds to the seller under agreed-upon terms.
- Hammer price – the nominal price at which a lot is sold; the winner is responsible for paying any additional fees and taxes on top of this amount
- Increment – a minimum amount by which a new bid must exceed the previous bid. An auctioneer may decrease the increment when it appears that bidding on an item may stop, so as to get a higher hammer price. Alternatively, a participant may offer a bid at a smaller increment, which the auctioneer has the discretion to accept or reject.

- Lot – either a single item being sold, or a group of items (which may or may not be similar or identical, such as a "job lot" of manufactured goods) that are bid on as one unit.
 - If the lot is for a group of items, the price paid is for the entire lot and the winning bidder must take all the items sold.
 - Variants on a group lot bid include "choice" and "times the money".
 - Example: An auction has five bath fragrance gift baskets where bidding is "lot", and the hammer price is USD \$5. The winner must pay \$5 (as the price is for the whole lot) and must take all five baskets.
- Minimum bid – The smallest opening bid that will be accepted.
 - A minimum bid can be as little as USD\$0.01 (one cent) depending on the auction.
 - If no one bids at the initial minimum bid, the auctioneer may lower the minimum bid so as to create interest in the item.
 - The minimum bid differs from a reserve price in that the auctioneer sets the minimum bid, while the seller sets the reserve price (if desired).
- "New money" - a new bidder, joining bidding for an item after others have bid against each other.
- No reserve auction (a/k/a "absolute auction") – an auction in which there is no minimum acceptable price; so long as the winning bid is at least the minimum bid, the seller must honor the sale.
- Outbid (also spelled "out-bid" or "out bid") – to bid higher than another bidder.
- Opening bid – the first bid placed on a particular lot. The opening bid must be at least the minimum bid, but may be higher (e.g., a bidder may shout out a considerably larger bid than minimum, to discourage other bidders from bidding).
- Paddle - a numbered instrument used to place a bid
- Protecting a Market - when a dealer places a bid on behalf of an artist he or she represents or otherwise has a financial interest in ensuring a high price. Artists represented by major galleries typically expect this kind of protection from their dealers.
- Proxy bid (a/k/a "absentee bid") – a bid placed by an authorized representative of a bidder who is not physically present at the auction.
 - Proxy bids are common in auctions of high-end items, such as art sales (where the proxy represents either a private bidder who does not want to be disclosed to the public, or a museum bidding on a particular item for its collection).
 - If the proxy is outbid on an item during the auction, the proxy (depending on the instructions of the bidder) may either increase the bid

(up to a set amount established by the bidder) or be required to drop out of the bidding for that item.

- A proxy may also be limited by the bidder in the total amount to spend on items in a multi-item auction.
- Relisting - re-selling an item that has already been sold at auction, but where the buyer did not take possession of the item (for example, in a real estate auction, the buyer did not provide payment by the closing date).
- Reserve price – A minimum acceptable price established by the seller prior to the auction, which may or may not be disclosed to the bidders.
 - If the winning bid is below the reserve price, the seller has the right to reject the bid and withdraw the item(s) being auctioned.
 - The reserve price differs from a minimum bid , in that the seller sets the reserve price (if desired), while the auctioneer sets the minimum bid.
- Sealed bid - a submitted bid whose value is unknown to competitors.
- Sniping – the act of placing a bid just before the end of a timed auction, thus giving other bidders no time to enter new bids.
- Specialist - on-staff trained professionals who put together the auction
- The "three Ds" death, divorce, or debt - sometimes a reason for an item to be sold at an auction
- Vendor bid - a bid by the person selling the item. The bid is sometimes a dummy bid but not always.
- White Glove Sale - an auction in which every single lot is sold

Bidding fee auction

A **bidding fee auction**, also called a **penny auction**, is a type of all-pay auction in which all participants must pay a non-refundable fee to place each small incremental bid. The auction ends after a period of time, typically ten to twenty seconds. Without new bids the last participant to have placed a bid wins the item and also pays the final bid price. The auctioneer makes money in two ways: the fees for each bid and the payment for the winning bid, totalling typically significantly more than the value of the item. Such auctions are typically held over the Internet, rather than in person.

Participants pay a fee to purchase bids. Each of the bids increases the price of the item by a small amount, such as one penny (0.01 USD, 1¢, or 0.01 GBP, 1p; hence the name of the auction), and extends the time of the auction by a few seconds. Bid prices vary by site and quantity purchased at a time, but generally cost 10–150 times the price of the bidding increment. The auctioneer receives the money paid for each bid, plus the final price of the item.

For example, if an item worth 1,000 currency units (dollars, euros, etc.) sells at a final price of 60, and a bid costing 1 raises the price of the item by 0.01, the auctioneer receives 6,000 for the 6,000 bids and 60 as the final price, a total of 6,060, a profit of 5,060. If the winning bidder used 150 bids in the process, they would have paid 150 for the bids plus 60 for the final price, a total of 210 and a saving of 790. All the other, losing, bidders collectively paid 5,850 and received nothing.

A TechCrunch article (July 26, 2010) on MadBid, one such site, called this model "a license to print money." By contrast in an article on Madbid, The Guardian (28 January 2012) comments "legions of penny auction sites have folded, including Swoopo, Rapid Bargain and Bid Boogie."

Due to the possibility of participants spending a lot of money and still losing an auction, or ultimately spending more than the retail value of the item they end up winning, some analysts have criticized the model or compared it to gambling, even when operating without fraud. The Better Business Bureau warns consumers, "although not all penny auction sites are scams, some are being investigated as online gambling. BBB recommends you ... know exactly how the bidding works, set a limit for yourself, and be prepared to walk away before you go over that limit." A penny auction may make the seller a far higher price than the item value. Potential fraudulent practices which can disadvantage buyers even more include shill bidding, where a human or software (bot) bidder covertly acting for the

seller places bids which make legitimate bidders continue bidding where otherwise the auction would end, and simply not sending out goods for which a price, albeit low, has been paid.

Some bidding fee auction sites have been shut down by state governments after investigations. Wavee US, LLC, settled with the Governor's Office of Consumer Protection in Georgia and agreed to close its website after the office received complaints about merchandise not being shipped in a timely fashion. Washington state shut down PennyBiddr after a lawsuit in which the state accused PennyBiddr of using shill bidding to drive up prices and extend auctions. In addition, several auction sites which claimed to be Better Business Bureau "Accredited" were not members of the BBB or had poor ratings with the BBB.

Compensation of employees

Compensation of employees (CE) is a statistical term used in national accounts, balance of payments statistics and sometimes in corporate accounts as well. It refers basically to the total gross (pre-tax) wages paid by employers to employees for work done in an accounting period, such as a quarter or a year.

However, in reality, the aggregate includes *more* than just gross wages, at least in national accounts and balance of payments statistics. The reason is that in these accounts, CE is defined as "the total remuneration, in cash or in kind, payable by an enterprise to an employee in return for work done by the latter during the accounting period". It represents effectively a total labour cost to an employer, paid from the gross revenues or the capital of an enterprise.

Compensation of employees is accounted for on an accrual basis; i.e., it is measured by the value of the remuneration in cash or in kind which an employee *becomes entitled to receive* from an employer in respect of work done, during the relevant accounting period – whether paid in advance, simultaneously, or in arrears of the work itself. This contrasts with other inputs to production, which are to be valued at the point when they are actually used.

For statistical purposes, the relationship of employer to employee exists, when there is an agreement, formal or informal, between an enterprise and a person, normally entered into voluntarily by both parties, whereby the person works for the enterprise, in return for remuneration in cash or in kind. The remuneration is normally based on either the time spent at work, or some other objective indicator of the amount of work done.

For social accounting purposes, CE is considered a component of the value of net output or value added (as factor income). The aim is not to measure income actually received by workers, but the *value* which labour contributes to net output along with other factors of production. The underlying idea is that the value of net output equals the factor incomes that generate it. For this reason, some types of remuneration received by employees are either included or excluded, because they are regarded as either related or unrelated to production or to the value of new output.

In different countries, what is actually included and excluded in CE may differ somewhat. The reason is that the way in which workers are compensated for their labour may be somewhat different in different types of economies. For example, in some countries workers get substantial payments "in kind", in others they don't. Systems of social insurance also differ between countries, and some countries have

little social insurance. One has to keep this in mind when comparing CE magnitudes for different countries.

A compensation system has to be aligned to the mission, vision, business strategy and organizational structure of a company to design the compensation plan in an efficient way to can achieve the goals. Businesses within the same organization will have different competitive conditions, acquire different business strategies, and design compensation strategies. A general compensation plan consists of three components: a base compensation, rewarding incentives, and indirect compensation in form of benefits.

The United Nations System of National Accounts (UNSNA) conceptually includes the following items in the statistical aggregate:

- gross wages and salaries earned by employees and payable in cash.
- cash allowances, overtime pay, bonuses, commissions, tips, and gratuities if paid by the employer to the employee.
- remuneration in kind paid by the employer to the employee valued at purchaser's prices, including meals and drinks, personal accommodation, uniforms worn outside of the workplace, vehicles or other durables provided for the personal use of employees, free personal travel, free personal fuel, recreational facilities, transport and parking subsidies, and creches for the children of employees.
- real or imputed social contributions and income taxes to government payable by the employee in respect of employment.
- the value of the social contributions in respect of labor hired, which are paid by employers – these may be actual social contributions payable by employers to social security schemes or to private funded social insurance schemes for employees; or imputed social contributions by employers providing unfunded social benefits.
- income of students from paid work, including the value they contribute through work for an educational institution.
- income received by shareholders who are also employees of the corporation, and who receive paid remuneration (e.g. stock options) other than dividends.
- income by outworkers who are paid by an enterprise for work done.
- the value of the interest foregone by employers when they provide loans to employees at reduced, or even zero rates of interest for purposes of buying houses, furniture or other goods or services.

UNSNA excludes the following items in the statistical aggregate:

- the value of unpaid voluntary work.

- income from self-employment (often included in operating surplus or gross profit).
- income of the unemployed.
- income of those not in the labor force.
- the value of work by unpaid family workers.
- property income as contrasted with labour income.
- taxes payable by the employer to the government in respect of the total gross salary bill.
- income of outworkers which consists of entitlements to products or profits of an enterprise. When the outworker is an own-account worker, the payment from the enterprise to the outworker is treated as a purchase of intermediate goods or services (however, self-employed income is not always treated in the same way by different countries).
- social benefits paid by government to employees (not directly related to the work they do).
- expenditures made by employees in order to enable them to take up their jobs or to carry out their work, including reimbursement of travel, removal or related expenses made by employees when they take up new jobs or are required by their employers to move elsewhere.
- expenditures by employees on tools, equipment, special clothing or other items that are needed exclusively, or primarily, to enable them to carry out their work (usually regarded as Intermediate consumption).
- employee social benefits paid by employers in the form of children's, spouse's, family, education or other allowances *in respect of dependents*.
- payments made at full, or reduced, wage or salary rates to workers absent from work, because of illness, accidental injury, maternity leave, etc.

Cost of goods sold

Cost of goods sold (COGS) refers to the carrying value of goods sold during a particular period.

Costs are associated with particular goods using one of the several formulas, including specific identification, first-in first-out (FIFO), or average cost. Costs include all costs of purchase, costs of conversion and other costs that are incurred in bringing the inventories to their present location and condition. Costs of goods made by the businesses include material, labor, and allocated overhead. The costs of those goods which are not yet sold are deferred as costs of inventory until the inventory is sold or written down in value.

Many businesses sell goods that they have bought or produced. When the goods are bought or produced, the costs associated with such goods are capitalized as part of inventory (or stock) of goods. These costs are treated as an expense in the period the business recognizes income from sale of the goods.

Determining costs requires keeping records of goods or materials purchased and any discounts on such purchase. In addition, if the goods are modified, the business must determine the costs incurred in modifying the goods. Such modification costs include labor, supplies or additional material, supervision, quality control and use of equipment. Principles for determining costs may be easily stated, but application in practice is often difficult due to a variety of considerations in the allocation of costs.

Cost of goods sold may also reflect adjustments. Among the potential adjustments are decline in value of the goods (i.e., lower market value than cost), obsolescence, damage, etc.

When multiple goods are bought or made, it may be necessary to identify which costs relate to which particular goods sold. This may be done using an identification convention, such as specific identification of the goods, first-in-first-out (FIFO), or average cost. Alternative systems may be used in some countries, such as last-in-first-out (LIFO), gross profit method, retail method, or combinations of these.

Cost of goods sold may be the same or different for accounting and tax purposes, depending on the rules of the particular jurisdiction. Certain expenses are included in COGS. Expenses that are included in COGS cannot be deducted again as a business expense. COGS expenses include:

- The cost of products or raw materials, including freight or shipping charges;

- The cost of storing products the business sells;
- Direct labor costs for workers who produce the products; and
- Factory overhead expenses.
- Depreciation

Inventories have a significant effect on profits. A business that makes or buys goods to sell must keep track of inventories of goods under all accounting and income tax rules. An example illustrates why. Fred buys auto parts and resells them. In 2008, Fred buys \$100 worth of parts. He sells parts for \$80 that he bought for \$30, and has \$70 worth of parts left. In 2009, he sells the remainder of the parts for \$180. If he keeps track of inventory, his profit in 2008 is \$50, and his profit in 2009 is \$110, or \$160 in total. If he deducted all the costs in 2008, he would have a loss of \$20 in 2008 and a profit of \$180 in 2009. The total is the same, but the timing is much different. Most countries' accounting and income tax rules (if the country has an income tax) require the use of inventories for all businesses that regularly sell goods they have made or bought.

Cost of goods purchased for resale includes purchase price as well as all other costs of acquisitions, excluding any discounts.

Additional costs may include freight paid to acquire the goods, customs duties, sales or use taxes not recoverable paid on materials used, and fees paid for acquisition. For financial reporting purposes such period costs as purchasing department, warehouse, and other operating expenses are usually not treated as part of inventory or cost of goods sold. For U.S. income tax purposes, some of these period costs must be capitalized as part of inventory. Costs of selling, packing, and shipping goods to customers are treated as operating expenses related to the sale. Both International and U.S. accounting standards require that certain abnormal costs, such as those associated with idle capacity, must be treated as expenses rather than part of inventory.

Discounts that must be deducted from the costs of purchased inventory are the following:

- Trade discounts (reduction in the price of goods that a manufacturer or wholesaler provides to a retailer) - includes a discount that is always allowed, regardless of the time of payment.
- Manufacturer's rebates—is based on the dealer's purchases during the year.

- Cash discounts (a reduction in the invoice price that the seller provides if the dealer pays immediately or within a specified time)—it may reduce COGS, or it may be treated separately as gross income.

Value added tax is generally not treated as part of cost of goods sold if it may be used as an input credit or otherwise recoverable from the taxing authority.

The cost of goods produced in the business should include all costs of production. The key components of cost generally include:

- Parts, raw materials and supplies used,
- Labor, including associated costs such as payroll taxes and benefits, and
- Overhead of the business allocable to production.

Most businesses make more than one of a particular item. Thus, costs are incurred for multiple items rather than a particular item sold. Determining how much of each of these components to allocate to particular goods requires either tracking the particular costs or making some allocations of costs. Parts and raw materials are often tracked to particular sets (*e.g.*, batches or production runs) of goods, then allocated to each item.

Labor costs include direct labor and indirect labor. Direct labor costs are the wages paid to those employees who spend all their time working directly on the product being manufactured. Indirect labor costs are the wages paid to other factory employees involved in production. Costs of payroll taxes and fringe benefits are generally included in labor costs, but may be treated as overhead costs. Labor costs may be allocated to an item or set of items based on timekeeping records.

Costs of materials include direct raw materials, as well as supplies and indirect materials. Where non-incidental amounts of supplies are maintained, the taxpayer must keep inventories of the supplies for income tax purposes, charging them to expense or cost of goods sold as used rather than as purchased.

Materials and labor may be allocated based on past experience, or standard costs. Where materials or labor costs for a period exceed the expected amount of standard costs, a *variance*. Such variances are then allocated among cost of goods sold and remaining inventory at the end of the period.

Determining overhead costs often involves making assumptions about what costs should be associated with production activities and what costs should be associated with other activities. Traditional cost accounting methods attempt to make these

assumptions based on past experience and management judgment as to factual relationships. Activity based costing attempts to allocate costs based on those factors that drive the business to incur the costs.

Overhead costs are often allocated to sets of produced goods based on the ratio of labor hours or costs or the ratio of materials used for producing the set of goods. Overhead costs may be referred to as factory overhead or factory burden for those costs incurred at the plant level or *overall burden* for those costs incurred at the organization level. Where labor hours are used, a *burden rate* or overhead cost per hour of labor may be added along with labor costs. Other methods may be used to associate overhead costs with particular goods produced. Overhead rates may be standard rates, in which case there may be variances, or may be adjusted for each set of goods produced.

In some cases, the cost of goods sold may be identified with the item sold. Ordinarily, however, the identity of goods is lost between the time of purchase or manufacture and the time of sale. Determining which goods have been sold, and the cost of those goods, requires either identifying the goods or using a convention to assume which goods were sold. This may be referred to as a cost flow assumption or inventory identification assumption or convention. The following methods are available in many jurisdictions for associating costs with goods sold and goods still on hand:

- Specific identification. Under this method, particular items are identified, and costs are tracked with respect to each item. This may require considerable recordkeeping. This method cannot be used where the goods or items are indistinguishable or fungible.
- Average cost. The average cost method relies on average unit cost to calculate cost of units sold and ending inventory. Several variations on the calculation may be used, including weighted average and moving average.
- First-In First-Out (FIFO) assumes that the items purchased or produced first are sold first. Costs of inventory per unit or item are determined at the time made or acquired. The oldest cost (*i.e.*, the first in) is then matched against revenue and assigned to cost of goods sold.
- Last-In First-Out (LIFO) is the reverse of FIFO. Some systems permit determining the costs of goods at the time acquired or made, but assigning costs to goods sold under the assumption that the goods made or acquired last are sold first. Costs of specific goods acquired or made are added to a pool of costs for the type of goods. Under this system, the business may maintain costs under FIFO but track an offset in the form of a LIFO reserve. Such reserve (an asset or contra-asset) represents the difference in cost of inventory under the FIFO

and LIFO assumptions. Such amount may be different for financial reporting and tax purposes in the United States.

- Dollar Value LIFO. Under this variation of LIFO, increases or decreases in the LIFO reserve are determined based on dollar values rather than quantities.
- Retail inventory method. Resellers of goods may use this method to simplify recordkeeping. The calculated cost of goods on hand at the end of a period is the ratio of cost of goods acquired to the retail value of the goods times the retail value of goods on hand. Cost of goods acquired includes beginning inventory as previously valued plus purchases. Cost of goods sold is then beginning inventory plus purchases less the calculated cost of goods on hand at the end of the period.

The value of goods held for sale by a business may decline due to a number of factors. The goods may prove to be defective or below normal quality standards (subnormal). The goods may become obsolete. The market value of the goods may simply decline due to economic factors.

Where the market value of goods has declined for whatever reasons, the business may choose to value its inventory at the lower of cost or market value, also known as *net realizable value*. This may be recorded by accruing an expense (*i.e.*, creating an inventory reserve) for declines due to obsolescence, etc. Current period net income as well as net inventory value at the end of the period is reduced for the decline in value.

Any property held by a business may decline in value or be damaged by unusual events, such as a fire. The loss of value where the goods are destroyed is accounted for as a loss, and the inventory is fully written off. Generally, such loss is recognized for both financial reporting and tax purposes. However, book and tax amounts may differ under some systems.

Deposit account

A **deposit account** is a savings account, current account or any other type of bank account that allows money to be deposited and withdrawn by the account holder. These transactions are recorded on the bank's books, and the resulting balance is recorded as a liability for the bank and represents the amount owed by the bank to the customer. Some banks may charge a fee for this service, while others may pay the customer interest on the funds deposited.

Major types

- Transactional accounts, known as "current accounts" in the Commonwealth and "checking accounts" in the United States

A deposit account for the purpose of securely and quickly providing frequent access to funds on demand, through various different channels. Because money is available on demand, these accounts are also referred to as "demand accounts" or "demand deposit accounts", except in the case of NOW accounts, which are rare checking accounts that require a seven-day notice before withdrawals.

- Money market account

A deposit account that pays interest at money market rates, and for which no notice or very short notice is required for withdrawals. In the United States, they are similar checking accounts in that they offer check-writing privileges and instant access but they are subject to the same regulations as savings accounts, including monthly transaction limits.

- Savings account

Accounts maintained by retail banks that pay interest but can not be used directly as money (for example, by writing a cheque or using a debit card at a point of sale), although cash can be withdrawn from these accounts at an automated teller machine. While they are not as convenient to use as checking accounts, these accounts generally offer consumers a higher rate of interest than a transactional account and will usually be linked to a transactional account.

- Time deposit, also known as a certificate of deposit in the United States

A money deposit at a banking institution that cannot be withdrawn for a preset fixed 'term' or period of time and will incur penalties for withdrawals before a certain date. When the term is over it can be withdrawn or it can be rolled over for another term. Generally speaking, the longer the term the higher the interest rate offered by the bank.

- Call deposit

A deposit account that allows for the withdrawal of funds without penalty but requires a higher minimum balance to earn interest.

- Sweep account

A deposit account in which amounts over a certain balance are automatically transferred to another account pursuant to a pre-determined set of arrangements.

How banking works

In banking, the verbs "deposit" and "withdrawal" mean a customer paying money into, and taking money out of, an account. From a legal and financial accounting standpoint, the noun "deposit" is used by the banking industry in financial statements to describe the liability owed by the bank to its depositor, and not the funds that the bank holds as a result of the deposit, which are shown as assets of the bank.

Subject to restrictions imposed by the terms and conditions of the account, the account holder (customer) retains the right to have the deposited money repaid on demand. The terms and conditions may specify the methods by which a customer may move money into or out of the account, e.g., by cheque, internet banking, EFTPOS or other channels.

For example, a depositor depositing \$100 in cash into a checking account at a bank in the United States surrenders legal title to the \$100 in cash, which becomes an asset of the bank. On the bank's books, the bank debits its cash account for the \$100 in cash, and credits a "deposits" liability account for an equal amount.

In the audited financial statements of the bank, the \$100 in currency would be shown on the balance sheet as an asset of the bank and the deposit account would be shown as a liability owed by the bank to its customer. The bank's financial statement reflects the economic substance of the transaction—which is that the bank has borrowed \$100 from its depositor and has contractually obliged itself to repay the customer according

to the terms of the agreement. These "physical" reserve funds may be held as deposits at the relevant central bank and will receive interest as per monetary policy.

Typically, a bank will not hold the entire sum in reserve, but will loan most of the money out to other clients, in a process known as fractional-reserve banking. This allows providers to earn interest on the asset and hence to pay out interest on deposits.

By transferring the ownership of deposits from one party to another, banks can avoid using physical cash as a method of payment. Commercial bank deposits account for most of the money supply in use today. For example, if a bank in the United States makes a loan to a customer by depositing the loan proceeds in that customer's checking account, the bank typically records this event by debiting an asset account on the bank's books (called loans receivable or some similar name) and credits the deposit liability or checking account of the customer on the bank's books. From an economic standpoint, the bank has essentially created economic money (although not legal tender). The customer's checking account balance has no dollar bills in it, as a demand deposit account is simply a liability owed by the bank to its customer. In this way, commercial banks are allowed to increase the money supply (without printing currency, or legal tender).

Banking operates under an intricate system of customs and conventions developed over many centuries. It is also normally subject to statutory regulations, such as reserve requirements developed to reduce the risk of failure of the bank. It may also have the purpose of reducing the extent of depositor losses in the event of bank failure.

To reduce the risk to depositors of a bank failure, some bank deposits may also be secured by a deposit insurance scheme, or be protected by a government guarantee scheme.

Derived demand

In economics **derived demand** is demand for a factor of production or intermediate good that occurs as a result of the demand for another intermediate or final good. - Derived In essence, the demand for one is dependent on that whose demand its demand is derived from. For example, if the demand for a good such as wheat increases, then this leads to an increase in the demand for labour. For another example, demand for steel leads to derived demand for steel workers, as steel workers are necessary for the production of steel. As the demand for steel increases, so does its price. The increase in price means manufacturers of steel can gain more in revenue if they produce more steel, thus leading to a higher demand for the resources involved in producing steel.

Demand for transport is another good example of derived demand, as users of transport are very often consuming the service not because they benefit from consumption directly (except in cases such as pleasure cruises), but because they wish to partake in other consumption elsewhere.

Derived demand applies to both consumers and producers. Producers have a derived demand for employees. The employees themselves do not appear in the employer's utility function; rather, they enable employers to profit by fulfilling the demand by consumers for their product. Clearly, the demand for labour is a derived demand from the demand for goods and services.

Another example is farm production and the demand for fertilizer. The demand for farm crops leads to the demand for fertilizer with which to grow them.

This is similar to the concept of joint demand or complementary goods, the quantity consumed of one of them depending positively on the quantity of the other consumed.

Direct labor cost

Direct labor cost is a part of wage-bill or payroll that can be specifically and consistently assigned to or associated with the manufacture of a product, a particular work order, or provision of a service. Also, we can say it is the cost of the work done by those workers who actually make the product on the production line.

Determination of the direct labor cost

- Planning the work to be performed.
- Describing the job content of the work, by indicating the skill, knowledge, etc.
- Matching the jobs with the employees.

The direct labor cost is part of the manufacturing cost.

The job time needs to be measured by one of the following ways:

1. time study
2. work sampling
3. Predetermined motion time system

Production economics

Production is a process of combining various material inputs and immaterial inputs (plans, know-how) in order to make something for consumption (the output). It is the act of creating output, a good or service which has value and contributes to the utility of individuals.

Economic well-being is created in a production process, meaning all economic activities that aim directly or indirectly to satisfy human wants and needs. The degree to which the needs are satisfied is often accepted as a measure of economic well-being. In production there are two features which explain increasing economic well-being. They are improving quality-price-ratio of goods and services and increasing incomes from growing and more efficient market production.

The most important forms of production are:

- market production
- public production
- household production

In order to understand the origin of the economic well-being, we must understand these three production processes. All of them produce commodities which have value and contribute to well-being of individuals.

The satisfaction of needs originates from the use of the commodities which are produced. The need satisfaction increases when the quality-price-ratio of the commodities improves and more satisfaction is achieved at less cost. Improving the quality-price-ratio of commodities is to a producer an essential way to improve the competitiveness of products but this kind of gains distributed to customers cannot be measured with production data. Improving the competitiveness of products means often to the producer lower product prices and therefore losses in incomes which are to compensated with the growth of sales volume.

Economic well-being also increases due to the growth of incomes that are gained from the growing and more efficient market production. Market production is the only production form which creates and distributes incomes to stakeholders. Public production and household production are financed by the incomes generated in market production. Thus market production has a double role in creating well-being, i.e. the role of producing goods and services and the role of creating income. Because of this double role market production is the “primus motor” of economic well-being and therefore here under review.

In principle there are two main activities in an economy, production and consumption. Similarly there are two kinds of actors, producers and consumers. Well-being is made possible by efficient production and by the interaction between producers and consumers. In the interaction, consumers can be identified in two roles both of which generate well-being. Consumers can be both customers of the producers and suppliers to the producers. The customers' well-being arises from the commodities they are buying and the suppliers' well-being is related to the income they receive as compensation for the production inputs they have delivered to the producers.

Productive and unproductive labour

Productive and unproductive labour are concepts that were used in classical political economy mainly in the 18th and 19th centuries, which survive today to some extent in modern management discussions, economic sociology and Marxist or Marxian economic analysis. The concepts strongly influenced the construction of national accounts in the Soviet Union and other Soviet-type societies

The classical political economists, such as Adam Smith and David Ricardo, raised the economic question of which kinds of labour contributed to increasing society's wealth, as against activities which do not increase wealth. In the introduction to *The Wealth of Nations*, Smith spoke of the "annual labour" and "the necessities and conveniences" a nation "annually consumes" before explaining that one of the two steps to increase wealth is reducing the amount of "unproductive labour". "Annual" and "annually" refer to a cyclical reproduction process; "unproductive labour" are commodities and services which are not inputs to the next economic circle and are therefore lost to economic growth. In contrast, theories with no such time horizon tend to understand Smith's unproductive labour as referring to services, and productive labour as meaning vendible goods. Smith's distinction between productive and unproductive labour corresponds to Sraffa's (1960) distinction of basic and non-basic goods, as basic goods re-enter the productive process, whereas non-basic goods are destined for consumption, with no value for reproduction.

As Edwin Cannan observes, Smith's view of annual reproduction and as a consequence the distinction of productive and unproductive labour stems from his meeting, and the influence of, the French economists known as the Physiocrats. Before his visit to France in his *Theory of Moral Sentiments* Adam Smith sees the gluttony of the landlords as an "invisible hand" which helps the poor to partake in the landlords wealth. In *The Wealth of Nations* it is seen as the consumption of unproductive labour, limiting the growth of wealth. Smith's view that human labour – but not unproductive labour – is the source of wealth reflects the classical position that all commodities can be reduced to actual labour and produced inputs which in turn resolve into labour and former inputs.

Within an enterprise, for example, there were many tasks which had to be performed, such as cleaning, record keeping and bookkeeping, and repairs, which did not directly contribute to producing and increasing wealth in the sense of making a net addition to it – in other words, such tasks represented a net cost to the enterprise which had to be minimized.

There were also whole occupations such as domestic servants, soldiers, schoolteachers, etc. which, although necessary, did not seem "productive" in the sense of increasing the material wealth of a society.

Part of the population consumed wealth but did not create it. To maximize economic growth, therefore, "unproductive costs" which consumed part of the total national income rather than adding to it should be "minimized; *productive labour had to be maximized*.

Many different economic and moral arguments were made to either justify or else criticise the incomes gained from different activities, on the ground that they were "productive" or "unproductive", "earned" or "unearned", "wealth-creating" or "wealth-consuming".

In neoclassical economics, the distinction between productive and unproductive labour was however rejected as being largely *arbitrary* and irrelevant. All the factors of production (land, labour and capital) create wealth and add value; they are all "productive".

If the *value* of a good is just what somebody is prepared to pay for it (or its marginal utility), then regarding some activities as value-creating and others not is a purely subjective matter; *any* activity which produces anything, or generates an income, could be considered *production* and *productive*, and the only question that remains is *how* productive it is.

This could be measured by striking a ratio between the monetary value of output produced, and the number of hours worked to produce it (or the number of workers who produce it). This is called a "output/labour ratio". The ratio "GDP per capita" is also used by some as an indicator of how productive a population is.

However, in calculating any output value, some concept of value is nevertheless required, because we cannot relate, group and aggregate prices (real or notional) at all without using a valuation principle. All accounting assumes a value theory, in this sense - we always need to distinguish conceptually the definition of value equivalence, comparable value, value transfer, loss of value, conservation of value and newly created value. For this purpose, a knowledge of prices is ultimately not sufficient, since the decision to group and categorize prices in a certain way involves criteria and valuations which themselves cannot be derived from prices.

A persisting management preoccupation, particularly in large corporations, also concerns the question of which activities of a business are value adding. The reason is simply that value-adding activities boost gross income and profit margins (note that

the "value-added" concept is a measure of the *net* output, or gross income, after deduction of materials costs from the total sales volume).

If the aim is to realise maximum shareholder value, two important valuation problems occur. Firstly, productive assets being used in production have no actual market price, being withdrawn from the market and not offered for sale. They have at best an historic cost, but this cost does not apply to inventories of new output produced. The current value of productive assets can therefore be estimated only according to a probable price that they would have, *if* they were sold, or if they were replaced. Secondly, there is the problem of what exactly the increases or decreases in the value of productive assets being held can be attributed to.

In what has become popularly known as "value-based management", these problems are pragmatically tackled with the accounting concepts of market-value added (MVA) and economic value-added (EVA). This style of management focuses very closely on how assets and activities contribute to maximum profit income.

Karl Marx regarded land and labour as the source of all wealth, and distinguished between *material* wealth and *human* wealth. Human wealth was a wealth in social relations, and the expansion of market trade created ever more of those. However, wealth and economic *value* were not the same thing in his view; value was a purely social category, a social attribution.

Both in *Das Kapital* and in *Theories of Surplus-Value*, Marx devoted a considerable amount of attention to the concept of "productive and unproductive labour". He sought to establish what economic and commercial ideas about productive labour would mean for the lives of the working class, and he wanted to criticise apologetic ideas about the "productive" nature of particular activities. This was part of an argument about the source of surplus value in unpaid surplus labour. His view can be summarised in the following 10 points.

- work is not "naturally productive", both in the sense that it takes work to make work productive, and that productive work depends on tools and techniques to be productive.
- generally speaking, a worker is *economically* productive and a source of additional wealth to the extent that s/he can produce more than is required for his/her own subsistence (i.e., is capable of performing surplus-labour) and adding to a surplus product.
- the definition of productive and unproductive labour is *specific* to each specific type of society (for example, feudal society, capitalist society, socialist society etc.) and depends on the given relations of production.

- there exists no neutral definition of productive and unproductive labour; what is productive from the point of view of one social class may not be productive from the point of view of another.
- the only objective definition of productive labour is in terms of what is as a matter of fact productive within the conditions of a given mode of production.
- from the point of view of the capitalist class, labour is productive, if it increases the value of (private) capital or results in (private) capital accumulation.
- *Capitalistically productive labour* is therefore labour which adds to the mass of surplus value, primarily through profitably producing goods and services for market sale.
- no new value is created through acts of exchange only; therefore, although labour which just facilitates exchange is "productive" from the employer's point of view (because he derives profit from it), it is unproductive from the social point of view because it accomplishes only a transfer of wealth. This "unproductive" labour is accepted however because it reduces the costs of capital accumulation, or facilitates it, or secures it.
- the definition of productive and unproductive labour is not static, but evolving; in the course of capitalist development, the division of labour is increasingly *modified*, to make more and more labour productive in the capitalistic sense, for example through marketisation and privatisation, value-based management, and Taylorism.
- whether work has been productive can really be known only "after the fact" in capitalist society, because commodity-producing living labour is in most cases definitely valued by the market only *after* it has been performed, when its product (a good or service) is exchanged and paid for.

Marx accordingly made, explicitly or implicitly 10 distinctions relevant to defining productive labour in a capitalist mode of production:

- commodity production, versus other production
- capitalist production versus non-capitalist production
- production versus circulation (exchange)
- production for profit, versus non-profit production
- productive consumption versus unproductive consumption
- material (tangible) production, versus non-material production
- production of use values, versus production of exchange-values
- production of value, versus appropriation of revenue
- production of income, versus distribution of income
- production versus destruction

In most cases, using these distinctions, it would be obvious whether the labour was capitalistically productive or not, but in a minority of cases it would be not altogether

clear or controversial. In part, that is because the division of labour is not static but constantly evolving. The general criterion which Marx suggests is that:

"If we have a function which, although in and for itself unproductive, is nevertheless a necessary moment of [economic] reproduction, then when this is transformed, through a division of labour, from the secondary activity of many into the exclusive activity of a few, into their special business, this does not change the character of the function itself" (Capital Vol. 2, Penguin ed., p. 209).

Obviously, functions falling outside capitalist production altogether would not be *capitalistically* productive.

Generally, Marx seems to have regarded labour as mainly unproductive from the point of view of capitalist society as a whole, if it involved functions which have to do purely with:

- the maintenance of a class-based social order as such (legal system, police, military, government administration).
- the maintenance and securing of private property relations (police, security, legal system, banking, accounting, licensing authorities etc.).
- operating financial transactions (in banking, financing, commercial trade, financial administration)
- insurance and safety.
- criminal activity.

Such activities were an inevitable *cost* to capitalist society which had to be met from reserves and from current income. This didn't necessarily mean that unproductive functions are *not socially useful* or economically useful in some sense; they might well be, but they normally did not directly *add* net new value to the total social product, that was the point, they were a (necessary) financial cost to society, paid for by a *transfer* of value created by the productive sector. Thus, they represented an appropriation or deduction from the surplus product, and not a net addition to it. Obviously, unproductive activities could stimulate productive activities however (for example, the production of security installations). Many unproductive costs are accepted by business, either because they involve activities which lower total business costs, and thereby indirectly contribute to income, or because they are unavoidable in doing business.

In the division of labour of modern advanced societies, unproductive functions in this Marxian sense occupy a very large part of the labour force; the wealthier a society is, the more "unproductive" functions it can afford. In the USA for example, one can calculate from labour force data that facilitating exchange processes and processing

financial claims alone is the main activity of more than 20 million workers. Legal staff, police, security personnel and military employees number almost 5 million workers.

The ecological critique focuses on mindless "production for production's sake", attacking both the neoclassical notion and the Marxist concept of "productiveness". It is argued neoclassical economics can understand the value of anything (and therefore the costs and benefits of an activity) *only* if it has a *price*, real or imputed. However, physical and human resources may have a value which *cannot* be expressed in price terms, and to turn them into an object of trade via some legal specification of property rights may be harmful to human life on earth. Activities may have *non-priced costs and benefits* which never feature on the balance sheet, at most in propaganda and advertising.

The Marxian view is also dismissed by ecologists, because it argues only human labour-time is the substance and source of economic value in capitalist society. Again, it is argued a very *restricted* idea of economic value is being operated with by Marxists. In part, this misses Marx's own point, namely that it was not him, but the growth of commercial trade which made labour-exploitation the fulcrum of wealth creation. Nevertheless, the ecological argument is that for the sake of a healthy future and a sustainable biosphere, a *new valuation scheme* for people and resources needs to be adopted.

The core of this critique is clearly an ethical one: all the existing economic theories *provide no healthy norms that would ensure correct stewardship for the environment* in which all people have to live. Markets provide no moral norms of their own apart from the law of contract. To develop a better concept of "productiveness" would require a new morality, a new view of human beings and the environment in which they live, so that harmful economic activity can be outlawed, and healthy alternatives promoted.

Ecologists typically distinguish between "good" and "bad" market trade and production. Some believe capitalism can "go green" (producing in an environmentally friendly way), and that capitalism is "cleaner" than Soviet-type socialism. Others think that capitalism *cannot* "go green" because of the nature of the beast; so long as human accounting is done in terms of private costs and private profits, many "external effects" (externalities) will be disregarded, and at most legal restrictions and taxation can limit the environmental damage somewhat.

In the Soviet Union and later other socialist countries in Eastern Europe, China and Cuba, a system of social accounts was created based around the notion of the "material product" (Material Product System, or MPS). This was an

alternative to GDP based accounts. Behind the MPS was a modernization theory according to which the criterion of progress consisted of the physical quantity of material goods being produced.

This system was, paradoxically, strongly influenced by Marx's critique of wealth creation in *capitalist* society, and his distinction between capitalistically productive and unproductive labour. The "material product" represented, in price terms, the net new value created annually by the production of *tangible material goods*. Many service industries were excluded from the material product; a rigorous statistical attempt was made to separate out a productive *sector* and an unproductive *sector*. Enterprise managers could be punished by law if they failed to provide accurate information.

Dissident socialists objected to this approach, because they felt that in a socialist society, "productive" labour should really be defined by such things as:

- whether the labour increases tangible wealth
- whether it is socially useful
- whether it is ecologically responsible
- whether it promotes human satisfaction
- whether it promotes human development
- whether it promotes human health and wellbeing

Since the end of communist rule in the USSR and Eastern Europe, however, the material product system has been abandoned, and new GDP-based accounts have been implemented following international standards recommended by the International Monetary Fund, the World Bank, and the United Nations System of National Accounts (UNSNA). The advantage of this change is that economic activity is more comprehensively valued and visible in monetary terms; a possible disadvantage is that no national accounting is done anymore of physical product units (e.g., x tons of steel produced, or y number of tractors assembled).

Productivity

Productivity describes various measures of the efficiency of production. A productivity measure is expressed as the ratio of output to inputs used in a production process, i.e. output per unit of input. Productivity is a crucial factor in production performance of firms and nations. Increasing national productivity can raise living standards because more real income improves people's ability to purchase goods and services, enjoy leisure, improve housing and education and contribute to social and environmental programs. Productivity growth also helps businesses to be more profitable. There are many different definitions of productivity and the choice among them depends on the purpose of the productivity measurement and/or data availability.

Productivity measures that use one class of inputs or factors, but not multiple factors, are called partial productivities. In practice, measurement in production means measures of partial productivity. Interpreted correctly, these components are indicative of productivity development, and approximate the efficiency with which inputs are used in an economy to produce goods and services. However, productivity is only measured partially – or approximately. In a way, the measurements are defective because they do not measure everything, but it is possible to interpret correctly the results of partial productivity and to benefit from them in practical situations. At the company level, typical partial productivity measures are such things as worker hours, materials or energy used per unit of production.

Before widespread use of computer networks, partial productivity was tracked in tabular form and with hand-drawn graphs. Tabulating machines for data processing began being widely used in the 1920s and 1930s and remained in use until mainframe computers became widespread in the late 1960s through the 1970s. By the late 1970s inexpensive computers allowed industrial operations to perform process control and track productivity. Today data collection is largely computerized and almost any variable can be viewed graphically in real time or retrieved for selected time periods.

In macroeconomics, a common partial productivity measure is labour productivity. Labour productivity is a revealing indicator of several economic indicators as it offers a dynamic measure of economic growth, competitiveness, and living standards within an economy. It is the measure of labour productivity (and all that this measure takes into account) which helps explain the principal economic foundations

that are necessary for both economic growth and social development. In general labour productivity is equal to the ratio between a measure of output volume (gross domestic product or gross value added) and a measure of input use (the total number of hours worked or total employment).

The output measure is typically net output, more specifically the value added by the process under consideration, i.e. the value of outputs minus the value of intermediate inputs. This is done in order to avoid double-counting when an output of one firm is used as an input by another in the same measurement. In macroeconomics the most well-known and used measure of value-added is the Gross Domestic Product or GDP. Increases in it are widely used as a measure of the economic growth of nations and industries. GDP is the income available for paying capital costs, labor compensation, taxes and profits.(OECD 2008,11) Some economists instead use gross value added (GVA); there is normally a strong correlation between GDP and GVA. (Freeman 2008,5)

The measure of input use reflects the time, effort and skills of the workforce. Denominator of the ratio of labour productivity, the input measure is the most important factor that influences the measure of labour productivity. Labour input is measured either by the total number of hours worked of all persons employed or total employment (head count). (Freeman 2008,5) There are both advantages and disadvantages associated with the different input measures that are used in the calculation of labour productivity. It is generally accepted that the total number of hours worked is the most appropriate measure of labour input because a simple headcount of employed persons can hide changes in average hours worked and has difficulties accounting for variations in work such as a part-time contract, leave of absence, overtime, or shifts in normal hours. However, the quality of hours-worked estimates is not always clear. In particular, statistical establishment and household surveys are difficult to use because of their varying quality of hours-worked estimates and their varying degree of international comparability.

GDP per capita is a rough measure of average living standards or economic well-being and is one of the core indicators of economic performance. (OECD 2008, 14) GDP is, for this purpose, only a very rough measure. Maximizing GDP, in principle, also allows maximizing capital usage. For this reason GDP is systematically biased in favour of capital intensive production at the expense of knowledge and labour-intensive production. The use of capital in the GDP-measure is considered to be as valuable as the production's ability to pay taxes, profits and labor compensation. The bias of the GDP is actually the difference between the GDP and the producer income. (Saari 2011,10,16)

Another labour productivity measure, output per worker, is often seen as a proper measure of labour productivity, as here: "Productivity isn't everything, but in the long run it is almost everything. A country's ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker." This measure (output per worker) is, however, more problematic than the GDP or even invalid because this measure allows maximizing all supplied inputs, i.e. materials, services, energy and capital at the expense of producer income.

When multiple inputs are considered, the measure is called multi-factor productivity or MFP. Multi-factor productivity is typically estimated using growth accounting. If the inputs specifically are labor and capital, and the outputs are value added intermediate outputs, the measure is called total factor productivity or TFP. TFP measures the residual growth that cannot be explained by the rate of change in the services of labour, capital and intermediate outputs. MFP replaced the term TFP used in the earlier literature, and both terms continue in use (usually interchangeably) (Hulten 2009,7).

TFP is often interpreted as a rough average measure of productivity, more specifically the contribution to economic growth made by factors such as technical and organisational innovation. (OECD 2008,11). The most famous description is that of Solow's (1957): "I am using the phrase 'technical change' as a shorthand expression for any kind of shift in the production function. Thus slowdowns, speed ups, improvements in the education of the labor force and all sorts of things will appear as 'technical change' ". The original MFP model (Solow 1957) involves several assumptions: that there is a stable functional relation between inputs and output at the economy-wide level of aggregation, that this function has neoclassical smoothness and curvature properties, that inputs are paid the value of their marginal product, that the function exhibits constant returns to scale, and that technical change has the Hicks'n neutral form (Hulten, 2009,5). In practice, TFP is "a measure of our ignorance", as Abramovitz (1956) put it, precisely because it is a residual. This ignorance covers many components, some wanted (like the effects of technical and organizational innovation), others unwanted (measurement error, omitted variables, aggregation bias, model misspecification) (Hulten 2000,11). Hence the relationship between TFP and productivity remains unclear.

When all outputs and inputs are included in the productivity measure it is called total productivity. A valid measurement of total productivity necessitates considering all production inputs. If we omit an input in productivity (or income accounting) this means that the omitted input can be used unlimitedly in production without any impact on accounting results. Because total productivity includes all production inputs it is used as an integrated variable when we want to explain income formation of production process.

Davis has considered the phenomenon of productivity, measurement of productivity, distribution of productivity gains, and how to measure such gains. He refers to an article suggesting that the measurement of productivity shall be developed so that it "will indicate increases or decreases in the productivity of the company and also the distribution of the 'fruits of production' among all parties at interest". According to Davis, the price system is a mechanism through which productivity gains are distributed, and besides the business enterprise, receiving parties may consist of its customers, staff and the suppliers of production inputs.

In the main article is presented the role of total productivity as a variable when explaining how income formation of production is always a balance between income generation and income distribution. The income change created by production function is always distributed to the stakeholders as economic values within the review period.

Productivity growth is a crucial source of growth in living standards. Productivity growth means more value is added in production and this means more income is available to be distributed.

At a firm or industry level, the benefits of productivity growth can be distributed in a number of different ways:

- to the workforce through better wages and conditions;
- to shareholders and superannuation funds through increased profits and dividend distributions;
- to customers through lower prices;
- to the environment through more stringent environmental protection; and
- to governments through increases in tax payments (which can be used to fund social and environmental programs).

Productivity growth is important to the firm because it means that it can meet its (perhaps growing) obligations to workers, shareholders, and governments (taxes and regulation), and still remain competitive or even improve its competitiveness in the market place. Adding more inputs will not increase the income earned per unit of input (unless there are increasing returns to scale). In fact, it is likely to mean lower average wages and lower rates of profit. But, when there is productivity growth, even the existing commitment of resources generates more output and income. Income generated per unit of input increases. Additional resources are also attracted into production and can be profitably employed.

In the most immediate sense, productivity is determined by the available technology or know-how for converting resources into outputs, and the way in which resources

are organized to produce goods and services. Historically, productivity has improved through evolution as processes with poor productivity performance are abandoned and newer forms are exploited. Process improvements may include organizational structures (e.g. core functions and supplier relationships), management systems, work arrangements, manufacturing techniques, and changing market structure. A famous example is the assembly line and the process of mass production that appeared in the decade following commercial introduction of the automobile.

Mass production dramatically reduced the labor in producing parts for and assembling the automobile, but after its widespread adoption productivity gains in automobile production were much lower. A similar pattern was observed with electrification, which saw the highest productivity gains in the early decades after introduction. Many other industries show similar patterns. The pattern was again followed by the computer, information and communications industries in the late 1990s when much of the national productivity gains occurred in these industries.

There is a general understanding of the main determinants or drivers of productivity growth. Certain factors are critical for determining productivity growth. The Office for National Statistics (UK) identifies five drivers that interact to underlie long-term productivity performance: investment, innovation, skills, enterprise and competition.

- *Investment* is in physical capital — machinery, equipment and buildings. The more capital workers have at their disposal, generally the better they are able to do their jobs, producing more and better quality output.
- *Innovation* is the successful exploitation of new ideas. New ideas can take the form of new technologies, new products or new corporate structures and ways of working. Speeding up the diffusion of innovations can boost productivity.
- *Skills* are defined as the quantity and quality of labour of different types available in an economy. Skills complement physical capital, and are needed to take advantage of investment in new technologies and organisational structures.
- *Enterprise* is defined as the seizing of new business opportunities by both start-ups and existing firms. New enterprises compete with existing firms by new ideas and technologies increasing competition. Entrepreneurs are able to combine factors of production and new technologies forcing existing firms to adapt or exit the market.
- *Competition* improves productivity by creating incentives to innovate and ensures that resources are allocated to the most efficient firms. It also forces existing firms to organise work more effectively through imitations of organisational structures and technology.

Technology has enabled massive personal productivity gains—computers, spreadsheets, email, and other advances have made it possible for a knowledge worker to seemingly produce more in a day than was previously possible in a year. Environmental factors such as sleep and leisure play a significant role in work productivity and received wage. Drivers of productivity growth for creative and knowledge workers include improved or intensified exchange with peers or co-workers, as more productive peers have a stimulating effect on one's own productivity. Productivity is influenced by effective supervision and job satisfaction. Having an effective or knowledgeable supervisor (for example a supervisor who uses the Management by objectives method) has an easier time motivating their employees to produce more in quantity and quality. An employee who has an effective supervisor, motivating them to be more productive is likely to experience a new level of job satisfaction thereby becoming a driver of productivity itself.

Workplace bullying results in a loss of productivity, as measured by self-rated job performance. Over time, targets of bullying will spend more time protecting themselves against harassment by bullies and less time fulfilling their duties. Workplace incivility has also been associated with diminished productivity in terms of quality and quantity of work.

A toxic workplace is a workplace that is marked by significant drama and infighting, where personal battles often harm productivity. While employees are distracted by this, they cannot devote time and attention to the achievement of business goals. When toxic employees leave the workplace, it can improve the culture overall because the remaining staff become more engaged and productive. The presence of a workplace psychopath may have a serious detrimental impact on productivity in an organisation.

In companies in where the traditional hierarchy has been removed in favor of an egalitarian, team-based setup, the employees are often happier, and individual productivity is improved (as they themselves are better placed to increase the efficiency of the workflow). Companies that have these hierarchy removed and have their employees work more in teams are called Liberated companies .

Productivity is one of the main concerns of business management and engineering. Many companies have formal programs for continuously improving productivity, such as a production assurance program. Whether they have a formal program or not, companies are constantly looking for ways to improve quality, reduce downtime and inputs of labor, materials, energy and purchased services. Often simple changes to

operating methods or processes increase productivity, but the biggest gains are normally from adopting new technologies, which may require capital expenditures for new equipment, computers or software. Modern productivity science owes much to formal investigations that are associated with scientific management. Although from an individual management perspective, employees may be doing their jobs well and with high levels of individual productivity, from an organizational perspective their productivity may in fact be zero or effectively negative if they are dedicated to redundant or value destroying activities.

Overall productivity growth was relatively slow from the 1970s through the early 1990s. Although several possible causes for the slowdown have been proposed there is no consensus. The matter is subject to a continuing debate that has grown beyond questioning whether just computers can significantly increase productivity to whether the potential to increase productivity is becoming exhausted.

In order to measure productivity of a nation or an industry, it is necessary to operationalize the same concept of productivity as in a production unit or a company, yet, the object of modelling is substantially wider and the information more aggregate. The calculations of productivity of a nation or an industry are based on the time series of the SNA, System of National Accounts. National accounting is a system based on the recommendations of the UN (SNA 93) to measure total production and total income of a nation and how they are used. (Saari 2006, 9)

International or national productivity growth stems from a complex interaction of factors. Some of the most important immediate factors include technological change, organizational change, industry restructuring and resource reallocation, as well as economies of scale and scope. A nation's average productivity level can also be affected by the movement of resources from low-productivity to high-productivity industries and activities. Over time, other factors such as research and development and innovative effort, the development of human capital through education, and incentives from stronger competition promote the search for productivity improvements and the ability to achieve them. Ultimately, many policy, institutional and cultural factors determine a nation's success in improving productivity.

At the national level, productivity growth raises living standards because more real income improves people's ability to purchase goods and services (whether they are necessities or luxuries), enjoy leisure, improve housing and education and contribute to social and environmental programs. Some have suggested that the UK's 'productivity puzzle' is an urgent issue for policy makers and businesses to address in order to sustain growth. Over long periods of time, small differences in rates of productivity growth compound, like interest in a bank account, and can make an

enormous difference to a society's prosperity. Nothing contributes more to reduction of poverty, to increases in leisure, and to the country's ability to finance education, public health, environment and the arts'.

Productivity is considered basic statistical information for many international comparisons and country performance assessments and there is strong interest in comparing them internationally. The OECD publishes an annual Compendium of Productivity Indicators that includes both labor and multi-factor measures of productivity. Several statistical offices publish productivity accounting handbooks and manuals with detailed accounting instructions and definitions.

Supply and demand

In microeconomics, **supply and demand** is an economic model of price determination in a market. It postulates that in a competitive market, the unit price for a particular good, or other traded item such as labor or liquid financial assets, will vary until it settles at a point where the quantity demanded (at the current price) will equal the quantity supplied (at the current price), resulting in an economic equilibrium for price and quantity transacted.

Although it is normal to regard the quantity demanded and the quantity supplied as functions of the price of the goods, the standard graphical representation, usually attributed to Alfred Marshall, has price on the vertical axis and quantity on the horizontal axis.

Since determinants of supply and demand other than the price of the goods in question are not explicitly represented in the supply-demand diagram, changes in the values of these variables are represented by moving the supply and demand curves (often described as "shifts" in the curves). By contrast, responses to changes in the price of the good are represented as movements along unchanged supply and demand curves.

Supply schedule

A supply schedule is a table that shows the relationship between the price of a good and the quantity supplied. Under the assumption of perfect competition, supply is determined by marginal cost. That is, firms will produce additional output while the cost of producing an extra unit of output is less than the price they would receive.

A hike in the cost of raw goods would decrease supply, shifting costs up, while a discount would increase supply, shifting costs down and hurting producers as producer surplus decreases.

By its very nature, conceptualizing a supply curve requires the firm to be a perfect competitor (i.e. to have no influence over the market price). This is true because each point on the supply curve is the answer to the question "If this firm is *faced with* this potential price, how much output will it be able to and willing to sell?" If a firm has market power, its decision of how much output to provide to the market influences the market price, therefore the firm is not "faced with" any price, and the question becomes less relevant.

Economists distinguish between the supply curve of an individual firm and between the market supply curve. The market supply curve is obtained by summing the quantities supplied by all suppliers at each potential price. Thus, in the graph of the supply curve, individual firms' supply curves are added horizontally to obtain the market supply curve.

Economists also distinguish the short-run market supply curve from the long-run market supply curve. In this context, two things are assumed constant by definition of the short run: the availability of one or more fixed inputs (typically physical capital), and the number of firms in the industry. In the long run, firms have a chance to adjust their holdings of physical capital, enabling them to better adjust their quantity supplied at any given price. Furthermore, in the long run potential competitors can enter or exit the industry in response to market conditions. For both of these reasons, long-run market supply curves are generally flatter than their short-run counterparts.

The determinants of supply are:

1. Production costs: how much a goods costs to be produced. Production costs are the cost of the inputs; primarily labor, capital, energy and materials. They depend on the technology used in production, and/or technological advances.
2. Firms' expectations about future prices
3. Number of suppliers

Demand schedule

A demand schedule, depicted graphically as the demand curve, represents the amount of some goods that buyers are willing and able to purchase at various prices, assuming all determinants of demand other than the price of the good in question, such as income, tastes and preferences, the price of substitute goods, and the price of complementary goods, remain the same. Following the law of demand, the demand curve is almost always represented as downward-sloping, meaning that as price decreases, consumers will buy more of the good.

Just like the supply curves reflect marginal cost curves, demand curves are determined by marginal utility curves. Consumers will be willing to buy a given quantity of a good, at a given price, if the marginal utility of additional consumption is equal to the opportunity cost determined by the price, that is, the marginal utility of alternative consumption choices. The demand schedule is defined as the *willingness* and *ability* of a consumer to purchase a given product in a given frame of time.

It is aforementioned that the demand curve is generally downward-sloping, and there may exist rare examples of goods that have upward-sloping demand curves. Two different hypothetical types of goods with upward-sloping demand curves are Giffen goods (an inferior but staple good) and Veblen goods (goods made more fashionable by a higher price).

By its very nature, conceptualizing a demand curve requires that the purchaser be a perfect competitor—that is, that the purchaser has no influence over the market price. This is true because each point on the demand curve is the answer to the question "If this buyer is *faced with* this potential price, how much of the product will it purchase?" If a buyer has market power, so its decision of how much to buy influences the market price, then the buyer is not "faced with" any price, and the question is meaningless.

Like with supply curves, economists distinguish between the demand curve of an individual and the market demand curve. The market demand curve is obtained by summing the quantities demanded by all consumers at each potential price. Thus, in the graph of the demand curve, individuals' demand curves are added horizontally to obtain the market demand curve.

The determinants of demand are:

1. Income.
2. Tastes and preferences.
3. Prices of related goods and services.
4. Consumers' expectations about future prices and incomes that can be checked.

Equilibrium

Generally speaking, an equilibrium is defined to be the price-quantity pair where the quantity demanded is equal to the quantity supplied. It is represented by the intersection of the demand and supply curves. The analysis of various equilibria is a fundamental aspect of microeconomics:

Market equilibrium: A situation in a market when the price is such that the quantity demanded by consumers is correctly balanced by the quantity that firms wish to supply. In this situation, the market clears.

Changes in market equilibrium: Practical uses of supply and demand analysis often center on the different variables that change equilibrium price and quantity, represented as shifts in the respective curves. Comparative statics of such a shift traces the effects from the initial equilibrium to the new equilibrium.

Demand curve shifts:

When consumers increase the quantity demanded *at a given price*, it is referred to as an *increase in demand*. Increased demand can be represented on the graph as the curve being shifted to the right. At each price point, a greater quantity is demanded, as from the initial curve D_1 to the new curve D_2 . In the diagram, this raises the equilibrium price from P_1 to the higher P_2 . This raises the equilibrium quantity from Q_1 to the higher Q_2 . A movement along the curve is described as a "change in the quantity demanded" to distinguish it from a "change in demand," that is, a shift of the curve. There has been an *increase* in demand which has caused an increase in (equilibrium) quantity. The increase in demand could also come from changing tastes and fashions, incomes, price changes in complementary and substitute goods, market expectations, and number of buyers. This would cause the entire demand curve to shift changing the equilibrium price and quantity. Note in the diagram that the shift of the demand curve, by causing a new equilibrium price to emerge, resulted in *movement along* the supply curve from the point (Q_1, P_1) to the point (Q_2, P_2) .

If the *demand decreases*, then the opposite happens: a shift of the curve to the left. If the demand starts at D_2 , and *decreases* to D_1 , the equilibrium price will decrease, and the equilibrium quantity will also decrease. The quantity supplied at each price is the same as before the demand shift, reflecting the fact that the supply curve has not shifted; but the equilibrium quantity and price are different as a result of the change (shift) in demand.

Supply curve shifts:

When technological progress occurs, the supply curve shifts. For example, assume that someone invents a better way of growing wheat so that the cost of growing a given quantity of wheat decreases. Otherwise stated, producers will be willing to supply more wheat at every price and this shifts the supply curve S_1 outward, to S_2 —an *increase in supply*. This increase in supply causes the equilibrium price to decrease from P_1 to P_2 . The equilibrium quantity increases from Q_1 to Q_2 as consumers move along the demand curve to the new lower price. As a result of a supply curve shift, the price and the quantity move in opposite directions. If the quantity supplied *decreases*, the opposite happens. If the supply curve starts at S_2 , and shifts leftward to S_1 , the equilibrium price will increase and the equilibrium quantity will decrease as consumers move along the demand curve to the new higher price and associated lower

quantity demanded. The quantity demanded at each price is the same as before the supply shift, reflecting the fact that the demand curve has not shifted. But due to the change (shift) in supply, the equilibrium quantity and price have changed.

The movement of the supply curve in response to a change in a non-price determinant of supply is caused by a change in the y-intercept, the constant term of the supply equation. The supply curve shifts up and down the y axis as non-price determinants of demand change.

Partial equilibrium

Partial equilibrium, as the name suggests, takes into consideration only a part of the market to attain equilibrium.

Jain proposes: "A partial equilibrium is one which is based on only a restricted range of data, a standard example is price of a single product, the prices of all other products being held fixed during the analysis."

The supply-and-demand model is a **partial equilibrium** model of economic equilibrium, where the clearance on the market of some specific goods is obtained independently from prices and quantities in other markets. In other words, the prices of all substitutes and complements, as well as income levels of consumers are constant. This makes analysis much simpler than in a general equilibrium model which includes an entire economy.

Here the dynamic process is that prices adjust until supply equals demand. It is a powerfully simple technique that allows one to study equilibrium, efficiency and comparative statics. The stringency of the simplifying assumptions inherent in this approach make the model considerably more tractable, but may produce results which, while seemingly precise, do not effectively model real world economic phenomena.

Partial equilibrium analysis examines the effects of policy action in creating equilibrium only in that particular sector or market which is directly affected, ignoring its effect in any other market or industry assuming that they being small will have little impact if any.

Hence this analysis is considered to be useful in constricted markets.

Léon Walras first formalized the idea of a one-period economic equilibrium of the general economic system, but it was French economist Antoine Augustin Cournot and

English political economist Alfred Marshall who developed tractable models to analyze an economic system.

Other markets

The model of supply and demand also applies to various specialty markets.

The model is commonly applied to wages, in the market for labor. The typical roles of supplier and demander are reversed. The suppliers are individuals, who try to sell their labor for the highest price. The demanders of labor are businesses, which try to buy the type of labor they need at the lowest price. The equilibrium price for a certain type of labor is the wage rate. However, economist Steve Fleetwood revisited the empirical reality of supply and demand curves in labor markets and concluded that the evidence is "at best inconclusive and at worst casts doubt on their existence." For instance, he cites Kaufman and Hotchkiss (2006): "For adult men, nearly all studies find the labour supply curve to be negatively sloped or backward bending."

In both classical and Keynesian economics, the money market is analyzed as a supply-and-demand system with interest rates being the price. The money supply may be a vertical supply curve, if the central bank of a country chooses to use monetary policy to fix its value regardless of the interest rate; in this case the money supply is totally inelastic. On the other hand, the money supply curve is a horizontal line if the central bank is targeting a fixed interest rate and ignoring the value of the money supply; in this case the money supply curve is perfectly elastic. The demand for money intersects with the money supply to determine the interest rate.

Empirical estimation

Demand and supply relations in a market can be statistically estimated from price, quantity, and other data with sufficient information in the model. This can be done with simultaneous-equation *methods of estimation* in econometrics. Such methods allow solving for the model-relevant "structural coefficients," the estimated algebraic counterparts of the theory. The Parameter identification problem is a common issue in "structural estimation." Typically, data on exogenous variables (that is, variables other than price and quantity, both of which are endogenous variables) are needed to perform such an estimation. An alternative to "structural estimation" is reduced-form estimation, which regresses each of the endogenous variables on the respective exogenous variables.

Macroeconomic uses

Demand and supply have also been generalized to explain macroeconomic variables in a market economy, including the quantity of total output and the general price level. The aggregate demand-aggregate supply model may be the most direct application of supply and demand to macroeconomics, but other macroeconomic models also use supply and demand. Compared to microeconomic uses of demand and supply, different (and more controversial) theoretical considerations apply to such macroeconomic counterparts as aggregate demand and aggregate supply. Demand and supply are also used in macroeconomic theory to relate money supply and money demand to interest rates, and to relate labor supply and labor demand to wage rates.

History

The 256th couplet of Tirukkural, which was composed at least 2000 years ago, says that "if people do not consume a product or service, then there will not be anybody to supply that product or service for the sake of price".

According to Hamid S. Hosseini, the power of supply and demand was understood to some extent by several early Muslim scholars, such as fourteenth-century Syrian scholar Ibn Taymiyyah, who wrote: "If desire for goods increases while its availability decreases, its price rises. On the other hand, if availability of the good increases and the desire for it decreases, the price comes down."

John Locke's 1691 work *Some Considerations on the Consequences of the Lowering of Interest and the Raising of the Value of Money*. includes an early and clear description of supply and demand and their relationship. In this description demand is rent: "The price of any commodity rises or falls by the proportion of the number of buyer and sellers" and "that which regulates the price... [of goods] is nothing else but their quantity in proportion to their rent."

In *The Wealth of Nations*, Smith generally assumed that the supply price was fixed but that its "merit" (value) would decrease as its "scarcity" increased, in effect what was later called the law of demand also. Ricardo, in *Principles of Political Economy and Taxation*, more rigorously laid down the idea of the assumptions that were used to build his ideas of supply and demand. Antoine Augustin Cournot first developed a mathematical model of supply and demand in his 1838 *Researches into the Mathematical Principles of Wealth*, including diagrams.

During the late 19th century the marginalist school of thought emerged. The main innovators of this approach were Stanley Jevons, Carl Menger, and Léon Walras.

The key idea was that the price was set by the subjective value of a good at the margin. This was a substantial change from Adam Smith's thoughts on determining the supply price.

In his 1870 essay "On the Graphical Representation of Supply and Demand", Fleeming Jenkin in the course of "introduc[ing] the diagrammatic method into the English economic literature" published the first drawing of supply and demand curves in English including comparative statics from a shift of supply or demand and application to the labor market. The model was further developed and popularized by Alfred Marshall in the 1890 textbook *Principles of Economics*.

Artificial intelligent buying platforms

Much of the buying and selling are now conducted online using platforms such as Amazon and eBay, where the profiles of the customers are captured and analyzed. Tshilidzi Marwala and Evan Hurwitz in their book observed that the advent of artificial intelligence and related technologies such as flexible manufacturing offers the opportunity for individualized demand and supply curves to be generated. This has been found to reduce the degree of arbitrage in the market, allow for individualized pricing for the same product and brings fairness and efficiency into the market.

The philosopher Hans Albert has argued that the *ceteris paribus* conditions of the marginalist theory rendered the theory itself an empty tautology and completely closed to experimental testing. In essence, he argues, the supply and demand curves (theoretical functions which express the quantity of a product which would be offered or requested for a given price) are purely ontological.

Cambridge economist Joan Robinson attacked the theory in similar line, arguing that the concept is circular: "Utility is the quality in commodities that makes individuals want to buy them, and the fact that individuals want to buy commodities shows that they have utility" Robinson also pointed out that if we take changes in peoples' behavior in relation to a change in prices or a change in the underlying budget constraint we can never be sure to what extent the change in behavior was due to the change in price or budget constraint and how much was due to a change in preferences. Sraffa's critique focused on the inconsistency (except in implausible circumstances) of partial equilibrium analysis and the rationale for the upward slope

of the supply curve in a market for a produced consumption good. The notability of Sraffa's critique is also demonstrated by Paul A. Samuelson's comments and engagements with it over many years, for example:

"What a cleaned-up version of Sraffa (1926) establishes is how *nearly empty* are *all* of Marshall's partial equilibrium boxes. To a logical purist of Wittgenstein and Sraffa class, the *Marshallian partial equilibrium* box of *constant* cost is even more empty than the box of *increasing* cost."

Supply shock

A **supply shock** is an event that suddenly increases or decreases the supply of a commodity or service, or of commodities and services in general. This sudden change affects the equilibrium price of the good or service or the economy's general price level.

In the short run, an economy-wide negative supply shock will shift the aggregate supply curve leftward, decreasing the output and increasing the price level. For example, the imposition of an embargo on trade in oil would cause an adverse supply shock, since oil is a key factor of production for a wide variety of goods. A supply shock can cause stagflation due to a combination of rising prices and falling output.

In the short run, an economy-wide positive supply shock will shift the aggregate supply curve rightward, increasing output and decreasing the price level. A positive supply shock could be an advance in technology (a technology shock) which makes production more efficient, thus increasing output.

Tangible property

Tangible property in law is, literally, anything which can be touched, and includes both real property and personal property (or moveable property), and stands in distinction to intangible property.

In English law and some Commonwealth legal systems, items of tangible property are referred to as *choses in possession* (or a *chose in possession* in the singular). However, some property, despite being physical in nature, is classified in many legal systems as intangible property rather than tangible property because the rights associated with the physical item are of far greater significance than the physical properties. Principally, these are documentary intangibles. For example, a promissory note is a piece of paper that can be touched, but the real significance is not the physical paper, but the legal rights which the paper confers, and hence the promissory note is defined by the legal debt rather than the physical attributes.

A unique category of property is money, which in some legal systems is treated as tangible property and in others as intangible property. Whilst most countries legal tender is expressed in the form of intangible property ("The Treasury of Country X hereby promises to pay to the bearer on demand..."), in practice bank notes are now rarely ever redeemed in any country, which has led to bank notes and coins being classified as tangible property in most modern legal systems.

Utility

In economics, **utility** is a measure of preferences over some set of goods and services; it represents satisfaction experienced by the consumer from a good. The concept is an important underpinning of rational choice theory in economics and game theory: since one cannot directly measure benefit, satisfaction or happiness from a good or service, economists instead have devised ways of representing and measuring utility in terms of measurable economic choices. Economists have attempted to perfect highly abstract methods of comparing utilities by observing and calculating economic choices; in the simplest sense, economists consider utility to be revealed in people's willingness to pay different amounts for different goods.

Utility is usually applied by economists in such constructs as the indifference curve, which plot the combination of commodities that an individual or a society would accept to maintain a given level of satisfaction. Utility and indifference curves are used by economists to understand the underpinnings of demand curves, which are half of the supply and demand analysis that is used to analyze the workings of goods markets.

Individual utility and social utility can be construed as the value of a utility function and a social welfare function respectively. When coupled with production or commodity constraints, under some assumptions these functions can be used to analyze Pareto efficiency, such as illustrated by Edgeworth boxes in contract curves. Such efficiency is a central concept in welfare economics.

In finance, utility is applied to generate an individual's price for an asset called the indifference price. Utility functions are also related to risk measures, with the most common example being the entropic risk measure.

It was recognized that utility could not be measured or observed directly, so instead economists devised a way to infer underlying relative utilities from observed choice. These 'revealed preferences', as they were named by Paul Samuelson, were revealed e.g. in people's willingness to pay:

Utility is taken to be correlative to Desire or Want. It has been already argued that desires cannot be measured directly, but only indirectly, by the outward phenomena to which they give rise: and that in those cases with which economics is chiefly

concerned the measure is found in the price which a person is willing to pay for the fulfillment or satisfaction of his desire.

There has been some controversy over the question whether the utility of a commodity can be measured or not. At one time, it was assumed that the consumer was able to say exactly how much utility he got from the commodity. The economists who made this assumption belonged to the 'cardinalist school' of economics. Today **utility functions**, expressing utility as a function of the amounts of the various goods consumed, are treated as either *cardinal* or *ordinal*, depending on whether they are or are not interpreted as providing more information than simply the rank ordering of preferences over bundles of goods, such as information on the strength of preferences.

When cardinal utility is used, the magnitude of utility differences is treated as an ethically or behaviorally significant quantity. For example, suppose a cup of orange juice has utility of 120 utils, a cup of tea has a utility of 80 utils, and a cup of water has a utility of 40 utils. With cardinal utility, it can be concluded that the cup of orange juice is better than the cup of tea by exactly the same amount by which the cup of tea is better than the cup of water. One cannot conclude, however, that the cup of tea is two thirds as good as the cup of juice, because this conclusion would depend not only on magnitudes of utility differences, but also on the "zero" of utility. For example, if the "zero" of utility was located at -40, then a cup of orange juice would be 160 utils more than zero, a cup of tea 120 utils more than zero.

Neoclassical economics has largely retreated from using cardinal utility functions as the basis of economic behavior. A notable exception is in the context of analyzing choice under conditions of risk .

Sometimes cardinal utility is used to aggregate utilities across persons, to create a social welfare function.

Discussion and criticism

Cambridge economist Joan Robinson famously criticized utility for being a circular concept: "Utility is the quality in commodities that makes individuals want to buy them, and the fact that individuals want to buy commodities shows that they have utility" Robinson also pointed out that because the theory assumes that preferences are fixed this means that utility is not a testable assumption. This is so because if we take changes in peoples' behavior in relation to a change in prices or a change in the underlying budget constraint we can never be sure to what extent the change in

behavior was due to the change in price or budget constraint and how much was due to a change in preferences. This criticism is similar to that of the philosopher Hans Albert who argued that the *ceteris paribus* conditions on which the marginalist theory of demand rested rendered the theory itself an empty tautology and completely closed to experimental testing. In essence, demand and supply curve (theoretical line of quantity of a product which would have been offered or requested for given price) is purely ontological and could never be demonstrated empirically.

Another criticism comes from the assertion that neither cardinal nor ordinal utility is empirically observable in the real world. In the case of cardinal utility it is impossible to measure the level of satisfaction "quantitatively" when someone consumes or purchases an apple. In case of ordinal utility, it is impossible to determine what choices were made when someone purchases, for example, an orange. Any act would involve preference over a vast set of choices (such as apple, orange juice, other vegetable, vitamin C tablets, exercise, not purchasing, etc.).

Other questions of what arguments ought to enter into a utility function are difficult to answer, yet seem necessary to understanding utility. Whether people gain utility from coherence of wants, beliefs or a sense of duty is key to understanding their behavior in the utility organon. Likewise, choosing between alternatives is itself a process of determining what to consider as alternatives, a question of choice within uncertainty.

An evolutionary psychology perspective is that utility may be better viewed as due to preferences that maximized evolutionary fitness in the ancestral environment but not necessarily in the current one.

Whole-life cost

Whole-life cost, or **Life-cycle cost** (LCC), refers to the total cost of ownership over the life of an asset. Also commonly referred to as "cradle to grave" or "womb to tomb" costs. Costs considered include the financial cost which is relatively simple to calculate and also the environmental and social costs which are more difficult to quantify and assign numerical values. Typical areas of expenditure which are included in calculating the whole-life cost include planning, design, construction and acquisition, operations, maintenance, renewal and rehabilitation, depreciation and cost of finance and replacement or disposal.

Whole-life cost analysis is often used for option evaluation when procuring new assets and for decision-making to minimize whole-life costs throughout the life of an asset. It is also applied to comparisons of actual costs for similar asset types and as feedback into future design and acquisition decisions.

The primary benefit is that costs which occur after an asset has been constructed or acquired, such as maintenance, operation, disposal, become an important consideration in decision-making. Previously, the focus has been on the up-front capital costs of creation or acquisition, and organisations may have failed to take account of the longer-term costs of an asset. It also allows an analysis of business function interrelationships. Low development costs may lead to high maintenance or customer service costs in the future. When making this calculation, the depreciation cost on the capital expense should not be included .

The use of environmental costs in a whole-life analysis allows a true comparison options, especially where both are quoted as "good" for the environment. For a major project such as the construction of a nuclear power station it is possible to calculate the environmental impact of making the concrete containment, the water required for refining the copper for the power plants and all the other components. Only by undertaking such an analysis is it possible to determine whether one solution carries a lower or higher environmental cost than another.

Almost all major projects have some social impact. This may be the compulsory re-location of people living on land about to be submerged under a reservoir or a threat to the livelihood of small traders from the development of a hypermarket nearby.

Whole-life costing is a key component in the economic appraisal associated with evaluating asset acquisition proposals. An economic appraisal is generally a broader

based assessment, considering benefits and indirect or intangible costs as well as direct costs.

In this way, the whole-life costs and benefits of each option are considered and usually converted using discount rates into net present value costs and benefits. This results in a benefit cost ratio for each option, usually compared to the "do-nothing" counterfactual. Typically the highest benefit-cost ratio option is chosen as the preferred option.

Historically, asset investments have been based on expedient design and lowest cost construction. If such investment has been made without proper analysis of the standard of service required and the maintenance and intervention options available, the initial saving may result in increased expenditure throughout the asset's life.

By using whole-life costs, this avoids issues with decisions being made based on the short-term costs of design and construction. Often the longer-term maintenance and operation costs can be a significant proportion of the whole-life cost.

During the life of the asset, decisions about how to maintain and operate the asset need to be taken in context with the effect these activities might have on the residual life of the asset. If by investing 10% more per annum in maintenance costs the asset life can be doubled, this might be a worthwhile investment.

Other issues which influence the lifecycle costs of an asset include:

- site conditions,
- historic performance of assets or materials,
- effective monitoring techniques,
- appropriate intervention strategies.

Although the general approach to determining whole-life costs is common to most types of asset, each asset will have specific issues to be considered and the detail of the assessment needs to be tailored to the importance and value of the asset. High cost assets (and asset systems) will likely have more detail, as will critical assets and asset systems.

Maintenance expenditure can account for many times the initial cost of the asset. Although an asset may be constructed with a design life of 30 years, in reality it will possibly perform well beyond this design life. For assets like these a balanced view between maintenance strategies and renewal/rehabilitation is required. The appropriateness of the maintenance strategy must be questioned, the point of intervention for renewal must be challenged. The process requires proactive

assessment which must be based on the performance expected of the asset, the consequences and probabilities of failures occurring, and the level of expenditure in maintenance to keep the service available and to avert disaster.

Whole-life cost is often referred to as "total cost of ownership (TCO)" when applied to IT hardware and software acquisitions. Use of the term "TCO" appears to have been popularised by Gartner Group in 1987 but its roots are considerably older, dating at least to the first quarter of the twentieth century.

It has since been developed as a concept with a number of different methodologies and software tools. A TCO assessment ideally offers a final statement reflecting not only the cost of purchase but all aspects in the further use and maintenance of the equipment, device, or system considered. This includes the costs of training support personnel and the users of the system, costs associated with failure or outage (planned and unplanned), diminished performance incidents (i.e. if users are kept waiting), costs of security breaches (in loss of reputation and recovery costs), costs of disaster preparedness and recovery, floor space, electricity, development expenses, testing infrastructure and expenses, quality assurance, boot image control, marginal incremental growth, decommissioning, e-waste handling, and more. When incorporated in any financial benefit analysis (e.g., ROI, IRR, EVA, ROIT, RJE) TCO provides a cost basis for determining the economic value of that investment.

Understanding and familiarity with the term TCO has been somewhat facilitated as a result of various comparisons between the TCO of open source and proprietary software. Because the software cost of open source software is often zero, TCO has been used as a means to justify the up-front licensing costs of proprietary software. Studies which attempt to establish the TCO and provide comparisons have as a result been the subject of many discussions regarding the accuracy or perceived bias in the comparison.

Total cost of ownership is also common in the automobile industry. In this context, the TCO denotes the cost of owning a vehicle from the purchase, through its maintenance, and finally its sale as a used car. Comparative TCO studies between various models help consumers choose a car to fit their needs and budget.

TCO can and often does vary dramatically against TCA (total cost of acquisition), although TCO is far more relevant in determining the viability of any capital investment, especially with modern credit markets and financing. TCO also directly relates to a business's total costs across all projects and processes and, thus, its profitability. Some instances of "TCO" appear to refer to "total cost of operation", but this may be a subset of the total cost of ownership if it excludes maintenance and support costs.

Brokerage firm

A **brokerage firm**, or simply **brokerage**, is a financial institution that facilitates the buying and selling of financial securities between a buyer and a seller.

Brokerage firms serve a clientele of investors who trade public stocks and other securities, usually through the firm's agent stockbrokers. A traditional, or "full service", brokerage firm usually undertakes more than simply carrying out a stock or bond trade. The staff of this type of brokerage firm is entrusted with the responsibility of researching the markets to provide appropriate recommendations, and in doing so they direct the actions of pension fund managers and portfolio managers alike. These firms also offer margin loans for certain approved clients to purchase investments on credit, subject to agreed terms and conditions.

Traditional brokerage firms have also become a source of up-to-date live stock prices and quotes. When a brokerage firm, in addition to buying and selling for clients, transacts for its own account, it is known as a broker-dealer.

A discount broker or an online broker is a firm that charges a relatively small commission by having its clients perform trades via automated, computerized trading platforms rather than by having an actual stockbroker assist with the trade. Most traditional brokerage firms offer discount options and compete heavily for client volume due to a shift towards this method of trading.

Other ways to lower costs for these brokers is by executing orders only a few times a day by aggregating orders from a large number of small investors into one or more block trades which are made at certain specific times during the day. They help lower costs in two ways:

- By matching buy and sell orders within the firm's order book, the overall quantity of stock to be traded can be reduced, thus reducing commissions payable to others by the brokerage firm.
- The broker can split the bid-ask spread with the investor when matching buy and sell orders.

Since investor money is pooled before stocks are bought or sold, it enables investors to contribute small amounts of cash with which fractional shares of specific stocks can be purchased. This is usually not possible with a regular stockbroker.

Many broker-dealers also serve primarily as distributors for mutual fund shares. These broker-dealers may be compensated in numerous ways and, like all broker-

dealers in the United States, are subject to compliance with requirements of the US Securities and Exchange Commission and one or more self-regulatory organizations, such as the Financial Industry Regulatory Authority (FINRA). In the meantime, distributors to be paid upfront fees and trail fees, which is now one form of distributor's earnings. The forms of compensation may be sales loads from investors, or Rule 12b-1 fees or servicing fees paid by the mutual funds.

Common-pool resource

In economics, a **common-pool resource (CPR)** is a type of good consisting of a natural or human-made resource system (e.g. an irrigation system or fishing grounds), whose size or characteristics makes it costly, but not impossible, to exclude potential beneficiaries from obtaining benefits from its use. Unlike pure public goods, common pool resources face problems of congestion or overuse, because they are subtractable. A common-pool resource typically consists of a core resource (e.g. water or fish), which defines the *stock variable*, while providing a limited quantity of extractable fringe units, which defines the *flow variable*. While the core resource is to be protected or nurtured in order to allow for its continuous exploitation, the fringe units can be harvested or consumed.

A common property rights regime system (not to be confused with a common-pool resource) is a particular social arrangement regulating the preservation, maintenance, and consumption of a common-pool resource. The use of the term "common property resource" to designate a type of good has been criticized, because common-pool resources are not necessarily governed by common property protocols. Examples of common-pool resources

include irrigation systems, fishing grounds, pastures, forests, water or the atmosphere. A pasture, for instance, allows for a certain amount of grazing to occur each year without the core resource being harmed. In the case of excessive grazing, however, the pasture may become more prone to erosion and eventually yield less benefit to its users. Because the core resources are vulnerable, common-pool resources are generally subject to problems of congestion, overuse, pollution, and potential destruction unless harvesting or use limits are devised and enforced.

The use of many common-pool resources, if managed carefully, can be extended because the resource system forms a negative feedback loop, where the stock variable continually regenerates the fringe variable as long as the stock variable is not compromised, providing an optimum amount of consumption. However, consumption exceeding the fringe value reduces the stock variable, which in turn decreases the flow variable. If the stock variable is allowed to regenerate then the fringe and flow variables may also recover to initial levels, but in many cases the loss is irreparable.

Common-pool resources may be owned by national, regional or local governments as public goods, by communal groups as common property resources, or by private individuals or corporations as private goods. When they are owned by no one, they are used as open access resources. Having observed a number of common pool resources throughout the world, Elinor Ostrom noticed that a number of them are governed by common property protocols — arrangements different from private property or state administration — based on self-management by a local community. Her observations contradict claims that common-pool resources must be privatized or else face destruction in the long run due to collective action problems leading to the overuse of the core resource .

Common property systems of management arise when users acting independently threaten the total net benefit from common-pool resource. In order to maintain the resources, protocols coordinate strategies to maintain the resource as a common property instead of dividing it up into parcels of private property. Common property systems typically protect the core resource and allocate the fringe resources through complex community norms of consensus decision-making. Common resource management has to face the difficult task of devising rules that limit the amount, timing, and technology used to withdraw various resource units from the resource system. Setting the limits too high would lead to overuse and eventually to the destruction of the core resource while setting the limits too low would unnecessarily reduce the benefits obtained by the users.

In common property systems, access to the resource is not free and common-pool resources are not public goods. While there is relatively free but monitored access to the resource system for community members, there are mechanisms in place which allow the community to exclude outsiders from using its resource. Thus, in a common property state, a common-pool resource appears as a private good to an outsider and as a common good to an insider of the community. The resource units withdrawn from the system are typically owned individually by the appropriators. A common property good is rivalled in consumption.

Analysing the design of long-enduring CPR institutions, Elinor Ostrom identified eight design principles which are prerequisites for a stable CPR arrangement:

1. Clearly defined boundaries
2. Congruence between appropriation and provision rules and local conditions
3. Collective-choice arrangements allowing for the participation of most of the appropriators in the decision making process

4. Effective monitoring by monitors who are part of or accountable to the appropriators
5. Graduated sanctions for appropriators who do not respect community rules
6. Conflict-resolution mechanisms which are cheap and easy of access
7. Minimal recognition of rights to organize (e.g., by the government)
8. In case of larger CPRs: Organisation in the form of multiple layers of nested enterprises, with small, local CPRs at their bases.

Common property systems typically function at a local level to prevent the overexploitation of a resource system from which fringe units can be extracted. In some cases, government regulations combined with tradable environmental allowances (TEAs) are used successfully to prevent excessive pollution, whereas in other cases — especially in the absence of a unique government being able to set limits and monitor economic activities — excessive use or pollution continue.

The management of common-pool resources is highly dependent upon the type of resource involved. An effective strategy at one location, or of one particular resource, may not be necessarily appropriate for another. In *The Challenge of Common-Pool Resources*, Ostrom makes the case for adaptive governance as a method for the management of common-pool resources. Adaptive governance is suited to dealing with problems that are complex, uncertain and fragmented, as is the management of common-pool resources. Ostrom outlines five basic protocol requirements for achieving adaptive governance. These include:

- Achieving accurate and relevant information, by focusing on the creation and use of timely scientific knowledge on the part of both the managers and the users of the resource
- Dealing with conflict, acknowledging the fact that conflicts will occur, and having systems in place to discover and resolve them as quickly as possible
- Enhancing rule compliance, through creating responsibility for the users of a resource to monitor usage
- Providing infrastructure, that is flexible over time, both to aid internal operations and create links to other resources
- Encouraging adaption and change to address errors and cope with new developments

This section is about non-excludable resources in economics. It is not to be confused with Open access publishing of academic works.

In economics, open access resources are, for the most part, rivalrous, non-excludable goods. This makes them similar to common goods during times of prosperity. Unlike many common goods, open access goods require little oversight or may be difficult to restrict access. However, as these resources are first come, first served, they may be affected by the phenomenon of the tragedy of the commons. Two possibilities may follow: a common property or an open access system.

An open access system is set up to continue the ideals of an open access resource in which everything is up for grabs, e.g., land. This occurred during the expansion of the U.S. west where thousands of acres were given away to the first one to claim and work the land.

However, in a different setting, such as fishing, there will be drastically different consequences. Since fish are an open access resource, it is relatively simple to fish and profit. If fishing becomes profitable, there will be more fishers and fewer fish. Fewer fish lead to higher prices which will lead again to more fishers, as well as lower reproduction of fish. This is a negative externality and an example of problems that arise with open access goods.

Effective demand

In economics, **effective demand (ED)** in a market is the demand for a product or service which occurs when purchasers are constrained in a different market. It contrasts with **notional demand**, which is the demand that occurs when purchasers are not constrained in any other market. In the aggregated market for goods in general, demand, notional or effective, is referred to as aggregate demand. The concept of **effective supply** parallels the concept of effective demand. The concept of effective demand or supply becomes relevant when markets do not continuously maintain equilibrium prices.

One example involves spillovers from the labor market to the goods market. If there is labour market disequilibrium such that individuals cannot supply all the labor they want to supply, then the amount that they are able to supply will influence their demand for goods; the demand for goods, contingent on the constraint on the amount of labor that can be supplied, is their effective demand for goods. In contrast, if there were no labor market disequilibrium, individuals would simultaneously choose both their quantity of labor to supply and the quantity of goods to purchase, and the latter would be their notional demand for goods. In this example, the effective demand for goods would be less than the notional demand for goods.

Conversely, if there are goods market shortages, individuals may choose to supply less labor (and enjoy more leisure) than they would in the absence of goods market disequilibrium. The amount of labor they choose to supply, contingent on the constraint on the amount of goods they can buy, is the effective supply of labor.

Another example involves spillovers from credit markets to the goods market. If there is credit rationing, some individuals are constrained in the amount of funds they can borrow to finance goods purchases (including consumer durables and houses), so their effective demand for goods, as a function of this constraint, is less than their notional demand for goods (the amount they would buy if they could borrow all they want to).

Firms can also exhibit effective demands or supplies that differ from notional demands or supplies. They too can be credit constrained, resulting in their effective demand for goods such as physical capital differing from their notional demand. In addition, in a time of labor shortage, they are constrained in how much labor they can employ; therefore the amount of goods they choose to supply at any potential goods price—their effective supply of goods—will be less than their notional supply. And if firms are constrained by excess supply in the goods market, limiting how much goods

they can sell, then their effective demand for labor will be less than their notional demand for labor.

The excess demands in different markets can influence each other. The presence of excess demand in one market influences effective demand or supply in another market, which may influence the degree of disequilibrium in the latter market; in turn, the constraints imposed on participants in that market influence their effective demand or supply in the former market.

Classical economist David Ricardo embraced Say's Law, suggesting, in Keynes's formulation, that "supply creates its own demand". According to Say's Law, for every excess supply (glut) of goods in one market, there is a corresponding excess demand (shortage) in another. This theory suggests that a general glut can never be accompanied by inadequate demand for products on a macroeconomic level. In challenge of Say's Law, Thomas Malthus, Jean Charles Leonard de Sismondi and other 19th century economists argued that "effective demand" is the foundation of a stable economy. Responding to the Great Depression of the 20th century, in the 1930s Michał Kalecki and John Maynard Keynes concurred with the latter theory, suggesting that "demand creates its own supply" and developing a comprehensive theory of effective demand.

According to Keynesian economics, weak demand results in unplanned accumulation of inventories, leading to diminished production and income, and increased unemployment. This triggers a multiplier effect which draws the economy toward underemployment equilibrium. By the same token, strong demand results in unplanned reduction of inventories, which tends to increase production, employment, and incomes. If entrepreneurs consider such trends sustainable, investments typically increase, thereby improving potential levels of production.

In the 1960s Robert Clower and Axel Leijonhufvud did further work on effective demand, and in the 1970s Robert Barro and Herschel Grossman published a well-known model of spillover effects upon effective demand.

Fast-moving consumer goods

Fast-moving consumer goods (FMCG) or **consumer packaged goods (CPG)** are products that are sold quickly and at relatively low cost. Examples include non-durable goods such as packaged foods, beverages, toiletries, over-the-counter drugs and many other consumables. In contrast, durable goods or major appliances such as kitchen appliances are generally replaced over a period of several years.

Many fast moving consumer goods have a short shelf life, either as a result of high consumer demand or because the product deteriorates rapidly. Some FMCGs, such as meat, fruits and vegetables, dairy products, and baked goods, are highly perishable. Other goods, such as pre-packaged foods, soft drinks, chocolate, candies, toiletries, and cleaning products, have high turnover rates. The sales are sometimes influenced by holidays and seasons.

Packaging is critical for FMCGs. The logistics and distribution systems often require secondary and tertiary packaging to maximize efficiency. The unit pack or primary package is critical for product protection and shelf life and also provides information and sales incentives to consumers.

Though the profit margin made on FMCG products is relatively small (more so for retailers than the producers/suppliers), they are generally sold in large quantities; thus, the cumulative profit on such products can be substantial. FMCG is a classic case of low margin and high volume business.

Highest and best use

Highest and best use, or **highest or best use (HBU)**, is a concept that originated with early economists such as Irving Fisher (1867-1947), who conceptualized the idea of maximum productivity. One of the earliest citations of the term is found in the Minutes of the Maine Legislature as early as 1831 in speaking about the assessment and valuation of real estate: "*...the land was classified preceding such change of use, had such real estate been assessed at its highest and best use...*" It is the concept in real estate appraisal that shows how the highest value for a property is arrived at. In any case where the market value of real property is sought, that value must be based on its highest and best use. Highest and best use is always that use that would produce the highest value for a property, regardless of its actual current use. The Appraisal Institute of Canada defines the term highest and best use as:

The reasonably probable and legal use of property, that is physically possible, appropriately supported, and financially feasible, and that results in the highest value.

The Appraisal Institute defines highest and best use as follows:

The reasonably probable and legal use of vacant land or an improved property that is physically possible, appropriately supported, financially feasible, and that results in the highest value. The four criteria the highest and best use must meet are legal permissibility, physical possibility, financial feasibility, and maximum productivity. Alternatively, the probable use of land or improved property – specific with respect to the user and timing of the use – that is adequately supported and results in the highest present value. "

In some cases, a proposed use might be the highest and best use but for some cost that changes the net economics. An example might be an industrially-used site that can now be used legally for high-rise residential buildings, but would cost so much to clean up (remediate) that the value as currently used is higher. In that case, if it can be continued, the existing industrial use could be the highest and best use. In some cases appraisers are given specific instructions as to an assumed highest and best use. This use might not pass the tests discussed below as a legitimate highest and best use, and may very well produce a different value. One example of this might be a parkland valuation, where the appraiser has been instructed to ignore all other possible uses. Further, the highest and best use of a property can be a class of uses (such as retail or multi family), rather than a specific use (i.e. development of a fast food restaurant).

In order to determine the maximum potential of a property Land Use developers often have to embark on a three-step analysis involving property analysis, entitlement and

constraint analysis, and market analysis. In order to be considered as the highest and best use of a property however, any potential use must pass a series of tests. The exact definition of highest and best use varies, but generally the use must be the following:

- legally permissible
- physically possible
- financially feasible
- maximally productive

Only those uses that are, or may be, legally permitted are potential highest and best uses. This may exclude uses that are not, and unlikely to become, permitted by zoning, land use planning, uses forbidden by government regulations, and uses prohibited by deed restrictions or covenants.

Properties with a use that predates existing zoning or other property regulations may be *legally nonconforming*. Such *grandfathered uses* are generally legal even though they do not meet current zoning or other regulations. Since their use predates these regulations, they are "grandfathered in". However, some such uses may not be reproduced if the legally nonconforming improvement is destroyed or damaged beyond a certain point.

"Legally permissible" can be a tricky conceptual test, because even uses that are currently not permitted may be considered. This happens when there is a reasonable prospect (at least 50%) that the regulation, zoning, deed restriction, etc. can be changed to permit the proposed use.

Any potential use must be physically possible given the size, shape, topography, and other characteristics of the site. For example, a 40,000-square-foot (3,700 m²) single story warehouse would not fit on a 10,000-square-foot (930 m²) site; therefore, that use would fail the physical possibility test.

The highest and best use of a property must be financially feasible: the proposed use of a property must generate adequate revenue to justify the costs of construction plus a profit for the developer. In the case of an improved property, with obvious remaining economic life, the question of financial feasibility is somewhat irrelevant. In the case of an improved property with limited remaining economic life, the question of financial feasibility becomes a question of the maximally productive use of the site. If the value of the land as vacant exceeds the value of the property as

improved less reversion/demolition costs, then redevelopment of the site becomes the maximally productive use of the property, and continued use of the existing improvements that do not represent the highest net value of the site is considered to be financially unfeasible.

The Test of Highest and Best Use is applied to an improved property both *as improved* and *as if vacant*. Vacant properties are generally only given the *as vacant* test. The Highest and Best Use as vacant may be the same or different as the Highest and Best use as improved. For improved properties, the first analysis applied is the use of the property based on the assumption that the parcel is vacant. Then, the analysis focuses on the use that should be made of the property as it is currently improved. The extent to which the existing improvements differ from the highest and best use as-if vacant, reveals the extent of any functional obsolescence. Further, there are three potential actions that can be undertaken regarding the existing improvements: Retention of the existing improvements, modification of the improvements or the development scheme of the site, or demolition and removal of the improvements.

For example, house A in an area zoned for residential use may have a highest and best use as vacant and a highest and best use as improved that are both residential. A similar house B in a commercially zoned area may have a *highest and best use as vacant* as development to a commercial development, and the *highest and best use as improved* may be for continued use as a single family residence.

If the value of the commercial lot as vacant in "House B" exceeds the value of house as a residence as improved plus demolition costs, the overall highest and best use of this property would be the *as vacant* value of the commercial lot. For example, assume that "House B" has a value as a house of \$200,000, and a site value as a commercial lot of \$250,000 with a cost to demolish the house and prepare the site at \$25,000. The highest and best use of the site is to demolish the house and sell the site as a commercial lot. The market value would be \$225,000 (\$250,000 site value minus \$25,000 demolition cost). However, if the demolition costs rose to \$55,000, the highest and best use would be the existing residential use, because the value as a commercial lot (now \$195,000) would not exceed the existing value as a residence.

This would be the highest and best use of the property, even though it is contrary to what actually exists. Even if the house is not razed and the site sold as a commercial lot, the highest and best use is the commercial lot use. The market value of the property is driven by this hypothetical conversion, even if it never takes place, due to the utility that this potential conversion would bring to a purchaser.

The economic concepts of utility and substitution drive the highest and best use analysis. The highest and best use of a property determines its utility to a potential purchaser. A purchaser will pay no more for a property than a competing property with the same utility would command, while a seller would accept no less than another seller of a comparable property.

HBU is a designation to identify an entity that could have a higher value if used for a different purpose. There are many other similar concepts that are used in fields related to, yet outside of real estate appraisal as instructed in the Uniform Standards for Professional Appraisal Practice (USPAP). One example is Higher and Better Use (HBU), as explained below. According to an article prepared by an entity working with the US Fish and Wildlife Service, which was posted on the United States Fish and Wildlife Service website:

“These (HBUs) are defined as lands which have higher values for their non-timber amenities such as for recreation and conservation.”

Organizations such as the American Society of Farm Managers and Rural Appraisers (ASFMRA), the American Society of Appraisers (ASA) and the Appraisal Institute have issued guidance to their members stating that the use of non-economic valuation concepts such as the above must not be used in connection with concepts such as Market Value and Highest and Best Use when engaging in typical appraisal assignments. However, proponents of alternate valuation metrics point out that valuing land through a purely economic perspective often fails to capture important benefits to the public such as clean water, pleasing scenery, erosion control, and recreation. Public Interest Value is potentially the most well known alternate valuation concept and has been discussed by many authors and specifically addressed in the Uniform Appraisal Standards for Federal Land Acquisitions (UASFLA)” “.

In appraisals, an entity is assessed at its highest or best use to maximize value and increase revenue. However, the value of an entity at its highest or best use may not be greater than the value of an entity in its present use if remediation is required to convert the entity to a different use.

Public good

In economics, a **public good** is a good that is both non-excludable and non-rivalrous in that individuals cannot be effectively excluded from use and where use by one individual does not reduce availability to others.

Gravelle and Rees: "The defining characteristic of a public good is that consumption of it by one individual does not actually or potentially reduce the amount available to be consumed by another individual." In a non-economic sense, the term is often used to describe something that is useful for the public generally, such as education and infrastructure, although these are not "public goods" in the economic sense. This is in contrast to a common good which is non-excludable but is rivalrous to a certain degree.

Public goods include knowledge, official statistics, national security, common language(s), flood control systems, lighthouses, street lighting, and Wikipedia itself. Public goods that are available everywhere are sometimes referred to as global public goods. There is an important conceptual difference between the sense of "a" public good, or public "goods" in economics, and the more generalized idea of "the public good" (or common good, or public interest), "a shorthand signal for shared benefit at a societal level".

Many public goods may at times be subject to excessive use resulting in negative externalities affecting all users; for example air pollution and traffic congestion. Public goods problems are often closely related to the "free-rider" problem, in which people not paying for the good may continue to access it. Thus, the good may be under-produced, overused or degraded. Public goods may also become subject to restrictions on access and may then be considered to be club goods or private goods; exclusion mechanisms include copyright, patents, congestion pricing, and pay television.

There is a good deal of debate and literature on how to measure the significance of public goods problems in an economy, and to identify the best remedies.

Paul A. Samuelson is usually credited as the first economist to develop the theory of public goods. In his classic 1954 paper *The Pure Theory of Public Expenditure*, he defined a public good, or as he called it in the paper a "collective consumption good", as follows:

[goods] which all enjoy in common in the sense that each individual's consumption of such a good leads to no subtractions from any other individual's consumption of that good...

This is the property that has become known as *non-rivalry*. A *pure public good* exhibits a second property called *non-excludability*: that is, it is impossible to exclude any individuals from consuming the good.

However, many goods may satisfy the two public good conditions (*non-rivalry* and *non-excludability*) only to a certain extent or only some of the time. These goods are known as *impure public goods*.

The opposite of a public good is a *private good*, which does not possess these properties. A loaf of bread, for example, is a private good; its owner can exclude others from using it, and once it has been consumed, it cannot be used again.

A good that is rivalrous but *non-excludable* is sometimes called a *common-pool resource*. Such goods raise similar issues to public goods: the mirror to the *public goods problem* for this case is sometimes called the "tragedy of the commons". For example, it is so difficult to enforce restrictions on deep sea fishing that the world's fish stocks can be seen as a non-excludable resource, but one which is finite and diminishing.

The definition of non-excludability states that it is impossible to exclude individuals from consumption. Technology now allows radio or TV broadcasts to be encrypted such that persons without a special decoder are excluded from the broadcast. Many forms of information goods have characteristics of public goods. For example, a poem can be read by many people without reducing the consumption of that good by others; in this sense, it is non-rivalrous. Similarly, the information in most patents can be used by any party without reducing consumption of that good by others. Official statistics provide a clear example of information goods that are public goods, since they are created to be non-excludable. Creative works may be excludable in some circumstances, however: the individual who wrote the poem may decline to share it with others by not publishing it. Copyrights and patents both encourage the creation of such non-rival goods by providing temporary monopolies, or, in the terminology of public goods, providing a legal mechanism to enforce excludability for a limited period of time. For public goods, the "lost revenue" of the producer of the good is not part of the definition: a public good is a good whose consumption does not reduce any other's consumption of that good.

Debate has been generated among economists whether such a category of "public goods" exists. Steven Shavell has suggested the following:

when professional economists talk about public goods they do *not* mean that there are a general category of goods that share the same economic characteristics, manifest the same dysfunctions, and that may thus benefit from pretty similar corrective solutions...there is merely an infinite series of particular problems (some of overproduction, some of underproduction, and so on), each with a particular solution that cannot be deduced from the theory, but that instead would depend on local empirical factors.

Common confusion is that public goods are goods provided by the public sector. Although it is often the case that government is involved in producing public goods, this is not necessarily the case. Public goods may be *naturally* available. They may be produced by private individuals and firms, by non-state collective action, or they may not be produced at all.

The theoretical concept of public goods does not distinguish with regard to the geographical region in which a good may be produced or consumed. However, some theorists such as Inge Kaul use the term "global public good" for public goods which is non-rival and non-excludable throughout the whole world, as opposed to a public good which exists in just one national area. Knowledge has been held to be an example of a global public good, but also as a commons, the knowledge commons.

Social goods are defined as public goods that could be delivered as private goods, but are usually delivered by the government for various reasons, including social policy, and funded via public funds like taxes. Note that some writers have used the term "public good" to refer only to non-excludable "pure public goods" and refer to excludable public goods as "club goods".

Common examples of public goods include: defence, public fireworks, lighthouses, clean air and other environmental goods, and information goods, such as official statistics, software development, authorship, and invention. Some goods, like orphan drugs, require special governmental incentives to be produced, but cannot be classified as public goods since they do not fulfill the above requirements (non-excludable and non-rivalrous.) Law enforcement, streets, libraries, museums, and education are commonly misclassified as public goods, but they are technically classified in economic terms as quasi-public goods because excludability *is* possible, but they do still fit some of the characteristics of public goods.

The provision of a lighthouse is a standard example of a public good, since it is difficult to exclude ships from using its services. No ship's use detracts from that of others, but since most of the benefit of a lighthouse accrues to ships using

particular ports, lighthouse maintenance can be profitably bundled with port fees (Ronald Coase, *The Lighthouse in Economics* 1974). This has been sufficient to fund actual lighthouses.

Technological progress can create new public goods. The most simple examples are street lights, which are relatively recent inventions (by historical standards). One person's enjoyment of them does not detract from other persons' enjoyment, and it currently would be prohibitively expensive to charge individuals separately for the amount of light they presumably use. Official statistics are another example. The government's ability to collect, process and provide high-quality information to guide decision-making at all levels has been strongly advanced by technological progress. On the other hand, a public good's status may change over time. Technological progress can significantly impact excludability of traditional public goods: encryption allows broadcasters to sell individual access to their programming. The costs for electronic road pricing have fallen dramatically, paving the way for detailed billing based on actual use.

Some question whether defense is a public good. Murray Rothbard argues: "'national defense' is surely not an absolute good with only one unit of supply. It consists of specific resources committed in certain definite and concrete ways—and these resources are necessarily scarce. A ring of defense bases around New York, for example, cuts down the amount possibly available around San Francisco." Jeffrey Rogers Hummel and Don Lavoie note, "Americans in Alaska and Hawaii could very easily be excluded from the U.S. government's defense perimeter, and doing so might enhance the military value of at least conventional U.S. forces to Americans in the other forty-eight states. But, in general, an additional ICBM in the U.S. arsenal can simultaneously protect everyone within the country without diminishing its services".

Public goods are not restricted to human beings. Indeed, it is one aspect of the study of cooperation in biology.

Public goods provide a very important example of market failure, in which market-like behavior of individual gain-seeking does not produce efficient results. The production of public goods results in positive externalities which are not remunerated. If private organizations do not reap all the benefits of a public good which they have produced, their incentives to produce it voluntarily might be insufficient. Consumers can take advantage of public goods without contributing sufficiently to their creation. This is called the free rider problem, or occasionally, the "easy rider problem" (because consumers' contributions will be small but non-zero). If too many consumers decide to "free-ride", private costs exceed private benefits and the incentive to provide the good or service through the market disappears. The market thus fails to provide a good or service for which there is a need.

The free rider problem depends on a conception of the human being as *homo economicus*: purely rational and also purely selfish—extremely individualistic, considering only those benefits and costs that directly affect him or her. Public goods give such a person an incentive to be a free rider.

For example, consider national defense, a standard example of a pure public good. Suppose *homo economicus* thinks about exerting some extra effort to defend the nation. The benefits to the individual of this effort would be very low, since the benefits would be distributed among all of the millions of other people in the country. There is also a very high possibility that he or she could get injured or killed during the course of his or her military service.

On the other hand, the free rider knows that he or she cannot be excluded from the benefits of national defense, regardless of whether he or she contributes to it. There is also no way that these benefits can be split up and distributed as individual parcels to people. The free rider would not voluntarily exert any extra effort, unless there is some inherent pleasure or material reward for doing so (for example, money paid by the government, as with an all-volunteer army or mercenaries). The free-riding problem is even more complicated than it was thought to be until recently. Any time non-excludability results in failure to pay the true marginal value (often called the "demand revelation problem"), it will also result in failure to generate proper income levels, since households will not give up valuable leisure if they cannot individually increment a good. This implies that, for public goods without strong special interest support, under-provision is likely since benefit-cost analyses are being conducted at the wrong income levels, and all of the ungenerated income would have been spent on the public good, apart from general equilibrium considerations.

In the case of information goods, an inventor of a new product may benefit all of society, but hardly anyone is willing to pay for the invention if they can benefit from it for free. In the case of an information good, however, because of its characteristics of non-excludability and also because of almost zero reproduction costs, commoditization is difficult and not always efficient even from a neoclassical economic point of view.

An assurance contract is a contract in which participants make a binding pledge to contribute to building a public good, contingent on a quorum of a predetermined size being reached. Otherwise the good is not provided and any monetary contributions are refunded.

A dominant assurance contract is a variation in which an entrepreneur creates the contract and refunds the initial pledge plus an additional sum of money if the quorum is not reached. (The entrepreneur profits by collecting a fee if the quorum is reached

and the good is provided.) In game-theoretic terms this makes pledging to build the public good a dominant strategy: the best move is to pledge to the contract regardless of the actions of others.

A *Coasian solution*, named for the economist Ronald Coase, proposes that potential beneficiaries of a public good can negotiate to pool their resources and create it, based on each party's self-interested willingness to pay. His treatise, "The Problem of Social Cost" (1960), argued that if the transaction costs between potential beneficiaries of a public good are low—that it is easy for potential beneficiaries to find each other and organize a pooling their resources based upon the good's value to each of them—that public goods could be produced without government action.

Much later, Coase himself wrote that while what had become known as the Coase Theorem had explored the implications of zero transaction costs, he had actually intended to use this construct as a stepping-stone to understand the real world of positive transaction costs, corporations, legal systems and government actions:

I examined what would happen in a world in which transaction costs were assumed to be zero. My aim in doing so was not to describe what life would be like in such a world but to provide a simple setting in which to develop the analysis and, what was even more important, to make clear the fundamental role which transaction costs do, and should, play in the fashioning of the institutions which make up the economic system.

Coase also wrote:

The world of zero transaction costs has often been described as a Coasian world. Nothing could be further from the truth. It is the world of modern economic theory, one which I was hoping to persuade economists to leave. What I did in "The Problem of Social Cost" was simply to shed light on some of its properties. I argued in such a world the allocation of resources would be independent of the legal position, a result which Stigler dubbed the "Coase theorem.

Thus, while Coase himself appears to have considered the "Coase theorem" and Coasian solutions as simplified constructs to ultimately consider the real 20th-century world of governments and laws and corporations, these concepts have become attached to a world where transaction costs were much lower, and government intervention would unquestionably be less necessary.

A minor alternative, especially for information goods, is for the producer to refuse to release a good to the public until payment to cover costs is met. Author Stephen King, for instance, authored chapters of a new novel downloadable for free on his website

while stating that he would not release subsequent chapters unless a certain amount of money was raised. Sometimes dubbed *holding for ransom*, this method of public goods production is a modern application of the street performer protocol for public goods production. Unlike assurance contracts, its success relies largely on social norms to ensure (to some extent) that the threshold is reached and partial contributions are not wasted.

One of the purest Coasian solutions today is the new phenomenon of Internet crowdfunding. Here rules are enforced by computer algorithms and legal contracts as well as social pressure. For example, on the Kickstarter site, each funder authorizes a credit card purchase to buy a new product or receive other promised benefits, but no money changes hands until the funding goal is met. Because automation and the Internet so reduce the transaction costs for pooling resources, project goals of only a few hundred dollars are frequently crowdfunded, far below the costs of soliciting traditional investors. Other crowdfunded projects have raised over a million dollars, like the Arkyd-100 space satellite telescope funded on Kickstarter in June 2013. It would seem to be a clear instance of a Coase solution when a public good that always required government sponsorship in the 20th century can be efficiently organized from 18,000 individuals' self-interest (including rewards such as an orbital "selfie", and five minutes of observation time donated in their name to find potential killer asteroids).

Altruistic solutions

When enough people do not think like free-riders, the private and voluntary provision of public goods may be successful. For example, a free rider might come to a public park to enjoy its beauty, yet discard litter that makes it less enjoyable for others. Other public-spirited individuals don't do this and might even pick up existing litter. There could be many non-self-interested reasons to do this:

- One can derive pleasure from helping their community
- One may feel ashamed if their neighbors or friends saw them
- One could be emotionally attached to the public good

Good or bad social behavior is contagious: people unconsciously adapt their behavior to that of their peers. In psychology, this is known as conformity. Even people who engaged in free-riding by littering elsewhere are less likely to if they see others hold on to their trash.

Social norms can also be observed everywhere people interact, not only in physical spaces but in virtual communities on the Internet. Lawrence Lessig describes how social norms can regulate behavior in cyberspace: through an individual's perceptions from the (physical or virtual) surrounding community. For example, if a disabled person boards a crowded bus, everyone expects that some able-bodied person will volunteer their seat. The same social norm, although executed in a different environment, can also be applied to the Internet. If a user enters a discussion in a chat room and continues to use all capital letters or to make personal attacks ("flames") when addressing other users, the culprit may realize he or she has been blocked by other participants. As in real life, users learning to adapt to the social norms of cyberspace communities provide a public good—here, not suffering disruptive online behavior—for all the participants.

Experimental literature suggests that free riding can be overcome without any state intervention. Peer-to-peer punishment, that is, members sanction those members that do not contribute to the public good at a cost, is sufficient to establish and maintain cooperation. Such punishment is often considered altruistic, because it comes at a cost to the punisher, however, the exact nature remains to be explored. Whether costly punishment can explain cooperation is disputed. Recent research finds that costly punishment is less effective in real world environments. For example, punishment works relatively badly under imperfect information, where people cannot observe the behavior of others perfectly.

Invisible hand

The **invisible hand** is a term used by Adam Smith to describe the unintended social benefits of individual self-interested actions. The phrase was employed by Smith with respect to income distribution (1759) and production (1776). The exact phrase is used just three times in Smith's writings, but has come to capture his notion that individuals' efforts to pursue their own interest may frequently benefit society more than if their actions were directly intending to benefit society. Smith may have come up with the two meanings of the phrase from Richard Cantillon who developed both economic applications in his model of the isolated estate.

Smith first introduced the concept in *The Theory of Moral Sentiments*, written in 1759, invoking it in reference to income distribution. In this work, however, the idea of the market is not discussed, and the word "capitalism" is never used. By the time he wrote *The Wealth of Nations* in 1776, Smith had studied the economic models of the French Physiocrats for many years, and in this work the invisible hand is more directly linked to production, to the employment of capital in support of domestic industry. The only use of "invisible hand" found in *The Wealth of Nations* is in Book IV, Chapter II, "Of Restraints upon the Importation from foreign Countries of such Goods as can be produced at Home."

The idea of trade and market exchange automatically channeling self-interest toward socially desirable ends is a central justification for the laissez-faire economic philosophy, which lies behind neoclassical economics. In this sense, the central disagreement between economic ideologies can be viewed as a disagreement about how powerful the "invisible hand" is. In alternative models, forces which were nascent during Smith's lifetime, such as large-scale industry, finance, and advertising, reduce its effectiveness.

The first appearance of the invisible hand in Smith occurs in *The Theory of Moral Sentiments* (1759) in Part IV, Chapter 1, where he describes a selfish landlord as being led by an invisible hand to distribute his harvest to those who work for him:

The proud and unfeeling landlord views his extensive fields, and without a thought for the wants of his brethren, in imagination consumes himself the whole harvest ... [Yet] the capacity of his stomach bears no proportion to the immensity of his desires ... the rest he will be obliged to distribute among those, who prepare, in the nicest manner, that little which he himself makes use of, among those who fit up the palace in which this little is to be consumed, among those who provide and keep in order all the different baubles and trinkets which are employed in the economy of greatness; all of whom thus derive from his luxury and caprice, that share of the necessaries of life,

which they would in vain have expected from his humanity or his justice...The rich...are led by an **invisible hand** to make nearly the same distribution of the necessities of life, which would have been made, had the earth been divided into equal portions among all its inhabitants, and thus without intending it, without knowing it, advance the interest of the society...

The part of *The Wealth of Nations* (1776) which describes what future generations would consider to be Smith's invisible hand does not actually use the term. The process by which market competition channels individual self-interest is most clearly described in Book I, Chapter 7.

Adam Smith uses the metaphor in Book IV, Chapter II, paragraph IX of *The Wealth of Nations*.

But the annual revenue of every society is always precisely equal to the exchangeable value of the whole annual produce of its industry, or rather is precisely the same thing with that exchangeable value. As every individual, therefore, endeavours as much as he can both to employ his capital in the support of domestic industry, and so to direct that industry that its produce may be of the greatest value, every individual necessarily labours to render the annual revenue of the society as great as he can. He generally, indeed, neither intends to promote the public interest, nor knows how much he is promoting it. By preferring the support of domestic to that of foreign industry, he intends only his own security; and by directing that industry in such a manner as its produce may be of the greatest value, he intends only his own gain, and he is in this, as in many other cases, led by an **invisible hand** to promote an end which was no part of his intention. Nor is it always the worse for the society that it was not part of it. By pursuing his own interest he frequently promotes that of the society more effectually than when he really intends to promote it. I have never known much good done by those who affected to trade for the public good. It is an affectation, indeed, not very common among merchants, and very few words need be employed in dissuading them from it.

Only in *The History of Astronomy* (written before 1758) Smith speaks of *the invisible hand*, to which ignorants refer to explain natural phenomena otherwise unexplainable:

Fire burns, and water refreshes; heavy bodies descend, and lighter substances fly upwards, by the necessity of their own nature; nor was the invisible hand of Jupiter ever apprehended to be employed in those matters.

In *The Theory of Moral Sentiments* (1759) and in *The Wealth of Nations* (1776) Adam Smith speaks of *an* invisible hand, never of *the* invisible hand. In *The Theory of Moral Sentiments* Smith uses the concept to sustain a "trickling down" theory, a concept also

used in neoclassical development theory: The gluttony of the rich serves to feed the poor.

The rich ... consume little more than the poor, and in spite of their natural selfishness and rapacity, though they mean only their own conveniency, though the sole end which they propose from the labours of all the thousands whom they employ, be the gratification of their own vain and insatiable desires, they divide with the poor the produce of all their improvements. They are led by an *invisible hand* [emphasis added] to make nearly the same distribution of the necessaries of life, which would have been made, had the earth been divided into equal portions among all its inhabitants, and thus without intending it, without knowing it, advance the interest of the society, and afford means to the multiplication of the species. When Providence divided the earth among a few lordly masters, it neither forgot nor abandoned those who seemed to have been left out in the partition. These last too enjoy their share of all that it produces. In what constitutes the real happiness of human life, they are in no respect inferior to those who would seem so much above them. In ease of body and peace of mind, all the different ranks of life are nearly upon a level, and the beggar, who suns himself by the side of the highway, possesses that security which kings are fighting for.

Smith's visit to France and his acquaintance to the French *Économistes* (known as Physiocrats) changed his views from micro-economic optimisation to macro-economic growth as the end of Political Economy. So the landlord's gluttony in *The Theory of Moral Sentiments* is denounced in the *Wealth of Nations* as *unproductive labour*. Walker, the first president (1885 to 92) of the American Economic Association, concurred:

The domestic servant ... is not employed as a means to his master's profit. His master's income is not due in any part to his employment; on the contrary, that income is first acquired ... and in the amount of the income is determined whether the servant shall be employed or not, while to the full extent of that employment the income is diminished. As Adam Smith expresses it "a man grows rich by employing a multitude of manufacturers; he grows poor by maintaining a multitude of menial servants."

Smith's theoretical U-turn from a micro-economical to a macro-economical view is not reflected in *The Wealth of Nations*. Large parts of this book are retaken from Smith's lectures before his visit to France. So one must distinguish in *The Wealth of Nations* a micro-economical and a macro-economical Adam Smith. Whether Smith's quotation of *an invisible hand* in the middle of his work is a micro-economical statement or a macro-economical statement condemning monopolies and government interferences as in the case of tariffs and patents is debatable.

The concept of the "invisible hand" is nearly always generalized beyond Smith's original uses. The phrase was not popular among economists before the twentieth century; Alfred Marshall never used it in his *Principles of Economics* textbook and neither does William Stanley Jevons in his *Theory of Political Economy*. Paul Samuelson cites it in his *Economics* textbook in 1948:

Even Adam Smith, the canny Scot whose monumental book, "*The Wealth of Nations*" (1776) , represents the beginning of modern economics or political economy-even he was so thrilled by the recognition of an order in the economic system that he proclaimed the mystical principle of the "invisible hand": that each individual in pursuing his own selfish good was led, as if by an invisible hand, to achieve the best good of all, so that any interference with free competition by government was almost certain to be injurious. This unguarded conclusion has done almost as much harm as good in the past century and a half, especially since too often it is all that some of our leading citizens remember, 30 years later, of their college course in economics.

In this interpretation, the theory is that the Invisible Hand states that if each consumer is allowed to choose freely what to buy and each producer is allowed to choose freely what to sell and how to produce it, the market will settle on a product distribution and prices that are beneficial to all the individual members of a community, and hence to the community as a whole. The reason for this is that self-interest drives actors to beneficial behavior in a case of serendipity. Efficient methods of production are adopted to maximize profits. Low prices are charged to maximize revenue through gain in market share by undercutting competitors. Investors invest in those industries most urgently needed to maximize returns, and withdraw capital from those less efficient in creating value. All these effects take place dynamically and automatically.

Since Smith's time, this concept has been further incorporated into economic theory. Léon Walras developed a four-equation general equilibrium model that concludes that individual self-interest operating in a competitive market place produces the unique conditions under which a society's total utility is maximized. Vilfredo Pareto used an edgeworth box contact line to illustrate a similar social optimality.

Ludwig von Mises, in *Human Action* uses the expression "the invisible hand of Providence", referring to Marx's period, to mean evolutionary meliorism. He did not mean this as a criticism, since he held that secular reasoning leads to similar conclusions. Milton Friedman, a Nobel Memorial Prize winner in economics, called Smith's Invisible Hand "the possibility of cooperation without coercion." Kaushik Basu has called the First Welfare Theorem the Invisible Hand Theorem.

Some economists question the integrity of how the term "invisible hand" is currently used. Gavin Kennedy, Professor Emeritus at Heriot-Watt University in Edinburgh, Scotland, argues that its current use in modern economic thinking as a symbol of free market capitalism is not reconcilable with the rather modest and indeterminate manner in which it was employed by Smith. In response to Kennedy, Daniel Klein argues that reconciliation is legitimate. Moreover, even if Smith did not intend the term "invisible hand" to be used in the current manner, its serviceability as such should not be rendered ineffective. In conclusion of their exchange, Kennedy insists that Smith's intentions are of utmost importance to the current debate, which is one of Smith's association with the term "invisible hand". If the term is to be used as a symbol of liberty and economic coordination as it has been in the modern era, Kennedy argues that it should exist as a construct completely separate from Adam Smith since there is little evidence that Smith imputed any significance onto the term, much less the meanings given it at present.

The former Drummond Professor of Political Economy at Oxford, D. H. MacGregor, argued that:

The one case in which he referred to the 'invisible hand' was that in which private persons preferred the home trade to the foreign trade, and he held that such preference was in the national interest, since it replaced two domestic capitals while the foreign trade replaced only one. The argument of the two capitals was a bad one, since it is the amount of capital that matters, not its subdivision; but the invisible sanction was given to a Protectionist idea, not for defence but for employment. It is not surprising that Smith was often quoted in Parliament in support of Protection. His background, like ours today, was private enterprise; but any dogma of non-intervention by government has to make heavy weather in *The Wealth of Nations*.

Harvard economist Stephen Marglin argues that while the "invisible hand" is the "most enduring phrase in Smith's entire work", it is "also the most misunderstood."

Economists have taken this passage to be the first step in the cumulative effort of mainstream economics to prove that a competitive economy provides the largest possible economic pie (the so-called first welfare theorem, which demonstrates the Pareto optimality of a competitive regime). But Smith, it is evident from the context, was making a much narrower argument, namely, that the interests of businessmen in the security of their capital would lead them to invest in the domestic economy even at the sacrifice of somewhat higher returns that might be obtainable from foreign investment. . . .

David Ricardo . . . echoed Smith . . . [but] Smith's argument is at best incomplete, for it leaves out the role of foreigners' investment in the domestic economy. It would have

to be shown that the gain to the British capital stock from the preference of British investors for Britain is greater than the loss to Britain from the preference of Dutch investors for the Netherlands and French investors for France."

According to Emma Rothschild, Smith was actually being ironic in his use of the term. Warren Samuels described it as "a means of relating modern high theory to Adam Smith and, as such, an interesting example in the development of language."

Smith uses the metaphor in the context of an argument against protectionism and government regulation of markets, but it is based on very broad principles developed by Bernard Mandeville, Bishop Butler, Lord Shaftesbury, and Francis Hutcheson. In general, the term "invisible hand" can apply to any individual action that has unplanned, unintended consequences, particularly those that arise from actions not orchestrated by a central command, and that have an observable, patterned effect on the community.

Bernard Mandeville argued that private vices are actually public benefits. In *The Fable of the Bees* (1714), he laments that the "bees of social virtue are buzzing in Man's bonnet": that civilized man has stigmatized his private appetites and the result is the retardation of the common good.

Bishop Butler argued that pursuing the public good was the best way of advancing one's own good since the two were necessarily identical.

Lord Shaftesbury turned the convergence of public and private good around, claiming that acting in accordance with one's self-interest produces socially beneficial results. An underlying unifying force that Shaftesbury called the "Will of Nature" maintains equilibrium, congruency, and harmony. This force, to operate freely, requires the individual pursuit of rational self-interest, and the preservation and advancement of the self.

Francis Hutcheson also accepted this convergence between public and private interest, but he attributed the mechanism, not to rational self-interest, but to personal intuition, which he called a "moral sense." Smith developed his own version of this general principle in which six psychological motives combine in each individual to produce the common good. In *The Theory of Moral Sentiments*, vol. II, page 316, he says, "*By acting according to the dictates of our moral faculties, we necessarily pursue the most effective means for promoting the happiness of mankind.*"

Contrary to common misconceptions, Smith did not assert that all self-interested labour necessarily benefits society, or that all public goods are produced through self-interested labour. His proposal is merely that in a free market, people *usually* tend to

produce goods desired by their neighbours. The tragedy of the commons is an example where self-interest tends to bring an unwanted result.

The invisible hand is traditionally understood as a concept in economics, but Robert Nozick argues in *Anarchy, State and Utopia* that substantively the same concept exists in a number of other areas of academic discourse under different names, notably Darwinian natural selection. In turn, Daniel Dennett argues in *Darwin's Dangerous Idea* that this represents a "universal acid" that may be applied to a number of seemingly disparate areas of philosophical inquiry (consciousness and free will in particular).

Christian socialist R. H. Tawney saw Smith as putting a name on an older idea:

If preachers have not yet overtly identified themselves with the view of the natural man, expressed by an eighteenth-century writer in the words, trade is one thing and religion is another, they imply a not very different conclusion by their silence as to the possibility of collisions between them. The characteristic doctrine was one, in fact, which left little room for religious teaching as to economic morality, because it anticipated the theory, later epitomized by Adam Smith in his famous reference to the invisible hand, which saw in economic self-interest the operation of a providential plan... The existing order, except insofar as the short-sighted enactments of Governments interfered with it, was the natural order, and the order established by nature was the order established by God. Most educated men, in the middle of the [eighteenth] century, would have found their philosophy expressed in the lines of Pope:

Thus God and Nature formed the general frame,
And bade self-love and social be the same.

Naturally, again, such an attitude precluded a critical examination of institutions, and left as the sphere of Christian charity only those parts of life that could be reserved for philanthropy, precisely because they fell outside that larger area of normal human relations, in which the promptings of self-interest provided an all-sufficient motive and rule of conduct.

The Nobel Prize-winning economist Joseph E. Stiglitz, says: "the reason that the invisible hand often seems invisible is that it is often not there." Stiglitz explains his position:

Adam Smith, the father of modern economics, is often cited as arguing for the "invisible hand" and free markets: firms, in the pursuit of profits, are led, as if by an invisible hand, to do what is best for the world. But unlike his followers, Adam Smith

was aware of some of the limitations of free markets, and research since then has further clarified why free markets, by themselves, often do not lead to what is best. As I put it in my new book, *Making Globalization Work*, the reason that the invisible hand often seems invisible is that it is often not there. Whenever there are "externalities"—where the actions of an individual have impacts on others for which they do not pay, or for which they are not compensated—markets will not work well. Some of the important instances have long understood environmental externalities. Markets, by themselves, produce too much pollution. Markets, by themselves, also produce too little basic research. (The government was responsible for financing most of the important scientific breakthroughs, including the internet and the first telegraph line, and many bio-tech advances.) But recent research has shown that these externalities are pervasive, whenever there is imperfect information or imperfect risk markets—that is always. Government plays an important role in banking and securities regulation, and a host of other areas: some regulation is required to make markets work. Government is needed, almost all would agree, at a minimum to enforce contracts and property rights. The real debate today is about finding the right balance between the market and government (and the third "sector" – governmental non-profit organizations.) Both are needed. They can each complement each other. This balance differs from time to time and place to place.

Tadeusz Szuba, author of the model for the phenomenon of collective intelligence, proposed a theory – that Adam Smith's invisible hand metaphor is an occurring phenomenon that can be formalized, simulated and most probably used to propose all-new tools to analyze and predict markets in the future.

The proposed theory claims that the invisible hand is a symptom of the existence of another dimension of a market, which is of computational nature. A market and its agents are unaware of this, because only piece(s), or result(s) of this symptom can be observed. In this dimension, the nature of a market and agents creates a complete, programmable computer on the platform of brains of agents and the physical structure of the market. This computer is self-programming and since it exists and functions on the platform of market agents' brains, results of computations are outputted via the brains of agents and represent themselves as the behavior of a market. These computations are chaotic, distributed, parallel, and non-continuous, with interleaving threads of different computations.

These computations are driven by:

1. abstract value assigned to objects and services
2. calculations and logic inferences.

What is fundamental for the emergence of this computational dimension, is that market agents are able to assign value to objects, services and actions, are able to build in consciously chains of inferences, and are able to convert conclusions into business actions.

According to this theory, the invisible hand is much more powerful and universal than Adam Smith and contemporary economists even expected. The invisible hand performs market control on several levels: in terms of production and consumption (equilibrium optimization); in terms of new discoveries (technical market optimization); in terms of social behavior (social market optimization), such as modifying and discovering new rules of market behavior. It is expected that this discovery may lead to the creation of all-new tools and models for market analysis and prediction, compared with today's macroeconomic models.

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